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Agricultural Notes

W. P. Hogarty

At the time of this writing it is Christmas week and I haven't much on my mind that pertains to agricultural work, neither do I think that you care to read anything along that line. It is the social season for the farmers, so go your best, the time rolls around very soon when the more serious problems confront you. You have been well repaid for your efforts during the past year in the growing and harvesting of a very remunerative crop. You have taken advantage of the good fall weather, and prepared as much soil for next year's crop as time would permit, and we predict and wish for you a PROSPEROUS NEW YEAR. The government prosperity chart shows only a very small portion of the United States to be in a flourishing condition, and Colorado stands in the center of this prosperous territory, and we are, and should be, a satisfied and contented people. I want to take this occasion to thank the growers for the pleasant relations that exist between the growers and factory, and the hearty co-operation you gave us in the harvesting of the beet crop. Our beets were uniformly piled at the dumps and the shrink gives us the result of your efforts.

+ + + +

The following beet growers of the Longmont factory are feeding cattle for market this year. All told there are 10,809 head on feed:

C. O. & O. H. Andrew	71	Lynn W. Clark	80
Geo. H. Abbott	52	Harry Carlson	25
F. G. Bishopp	25	W. A. Dickens	225
Chas. H. Baker	100	J. A. Davidson	25
Albert Baller	30	W. H. & J. H. Dickens	750
F. J. & S. W. Bishopp	86	A. J. Emmons	350
J. W. Burtle	40	Furrer & Ramsay	25
E. F. & F. S. Beckwith	100	J. R. Forsyth, Jr.	50
W. E. Cushman	50	W. P. Forsyth	50

Ludlow' & McKee	1000
Grossman & Leinweber	114
Gregg, Johns'n & Cof'n	155
Gilmore & Clark	88
A. L. Gibson	100
Wm Hansen	120
O. C. Harris	25
Grant Hartman	56
C. Q. Hartshorn	55
F. M. Hartman	52
A. Hakanson	28
Hewitt & McCarty	350
E. S. Hamilton	50
L. M. Hammond	25
J. C. Hitt	50
Bert Hart	50
B. D. Ish	25
Howard Jay & Co.	206
L. E. Johnson	25
Jewett & Backstrum	100
Geo. J. Jones	46
Henry L. Johnson	64
Johnson & Carlson	54
C. A. Jillson	88
J. N. C. Jones	50
G. A. Logan	130
Albert Lund	230
Joe Lee	50
H. E. Middleton	60
E. H. & C. E. Miles	75
H. E. Miller	75
L. T. Mulligan	30
Morantz & Cohen	354
E. L. Montgomery	280
Miller & Johnson	460
Louis Meining	100
McCaslin & Co.	505
Lillian N. McGimsey	60
B. N. Newby, Sr.	53
Jno. H. Nicholas	50
Henry Ohrt	30
Chas. Olson & Co	20
Frank P. Parker	87
P. K. Patterson	10
Geo. R. Powell & Son	36
C. W. Pace	712
J. A. Pratt	32
H. L. Rice	105
Rasmussen Bros.	25
Rinn & Tarr	216
Ben & Jno. Reese	50
Reinert & Edwards	33
Reinert & Kautz	50
Louis Roman	25
Harry Stapp	88
Doud Smith	28
F. W. Snow	10
O. J. Stephens	113
F. R. Storm	25
Schauer Bros.	150
Irven Simmons	60
Fred N. Smith	65
W. E. Stubbs	53
Nick Schlupp	55
H. G. Slater	50
Dave St. Clair	73
Turner & Holt	50
Fred L. Thomas	54
Emmett Taylor	51
T. M. & Ole Thronds'n	63
D. W. Tollefson	28
Roy Taylor	80
Fred & Jno. Voake	60
Albert C. White	25
T. J. Wallace	25
Woodley & Markham	237
J. M. Wisecup	50
West & Nelson	90
Welker & Jepperson	173
H. J. Yeager	30

"Through The Leaves" Enters on Its Third Year

N. R. McCreery

With the publication of this number of "Through the Leaves" we begin its third year. Whether or not it has been worth while we must leave it to you to be judge. We have the feeling that it has been very kindly received and that considerable good has been accomplished by its visits to the homes of our farmers and friends

As we look back over the past year we feel a great deal of gratification over the results you have obtained. The beginning of the year was anything but a propitious one; unfavorable legislation had made necessary a reduction in the contract price to be paid for beets, and some hard feeling was engendered by reason of this reduction. Climatic conditions, however, were very favorable and nearly all farm crops made good growth and gave handsome yields. The beet crop for the past year is one of the best we have had, the average tons per acre in our Longmont district being 13.4 tons, with an average sugar content of, 16.63%. Northern Colorado farmers are almost all benefitting largely by the devastating war in Europe as the price of most farm products has been advanced thereby, beets as well as other crops. Under the contract you signed last spring you would have received $5.377 per ton for your average crop this year, but owing to the advance in the price of sugar you have received $5.86, or an average of .483 per ton more than your contract specified. Added to the satisfactory yield and prices, you have had a very exceptional period of weather to harvest and deliver your crop, and we find in talking with those who have traveled widely through all sections of the United

States that Northern Colorado farmers, business men and others know nothing of the hard times that prevail in other parts of the country. Never have we seen evidences of prosperity so abundant on every hand as is seen in the Longmont district this year. There are so many things all working for the upbuilding of farms in this section that if this good work continues, a few years will give the Longmont district the reputation of the richest and most fertile farming section in Colorado, or the United States. At this writing there are 11,000 head of cattle being fed on pulp in the Longmont district, a large part of which are scattered in small bunches on the farms. In addition to these it is estimated that there are about 2,000 head of cows being milked on these farms and their product delivered to the creamery in this town. Every where you go you see the silo, one of the surest harbingers of prosperous farming. The day will also come, and soon, when on practically every farm you will see the pit silo for the proper handling of the beet tops, and the combination of stock feeding, dairying and proper crop rotation with intense cultivation will hasten the day of better farms and farming. Surely as we look back we can say we are a favored people. We do not know what the future holds in store, conditions over the whole world are so unsettled and the effects of the war so far reaching that there is no one who can predict with any degree of certainty the happenings of the next few months. The indications are that while the nations of the old world are engaged in their struggle for national existence and while even in our own country there are thousands out of employment and the problem of life is a hard one for them, that the silver lining of this dark cloud will be visible to the people of Colorado, and that this will be one of the bright spots on the face of the world, which just now has so many dark and gloomy ones. That a large measure of this prosperity may come to you and yours the coming year is our wish.

Comments on the Beet Sugar Industry in Northern Colorado

A. V. Officer

The beet growers of Northern Colorado have reason for congratulation over the results they have achieved during the past season for they have had that happy trinity of conditions so essential to profitable husbandry, to-wit: good yields, good sugar and good prices.

In addition to these auspicious conditions, an ideal fall has contributed in no small degree to swell the net returns of the farmer, for the delivery of the crop is one of the main items of its expense and delays and interruptions during the harvesting period are expensive.

European conditions, while universally deplored, have contributed much to the prosperity of the beet growers this season, for it has been due to the European conflict that the market price of raw and refined sugar advanced, thus enabling us to reinstate our 1913 contract and restore tariff prices for beets.

It is true that in some of the factory districts, the sugar content of the crop this year was below normal, notably in the Eaton district, where the average was below 15%, due largely, we attribute, to "root aphis," but in the Loveland, Longmont and Fort Collins districts, both the sugar content and yield was above normal.

The average yield for the four factories under the supervision of the writer, to-wit: Eaton, Greeley, Windsor and Fort Collins, was 13.2 tons per acre. The average sugar content of these districts being 15.64% and the average price paid the grower $5.70 per ton.

I think few, even among our best informed merchants and farmers, realize the magnitude of the great industry that is here in their very midst, or to what degree the prosperiy of our farming and commercial interests are de-

pendent upon it and how closely our interests are linked together.

This perhaps is natural, as its growth has been gradual and it is only by contrasting conditions that existed before the beet sugar industry was developed in Northern Colorado, that we comprehend its benefits. Like "Good Health," perhaps it is something to be lost before it is appreciated.

The community benefits resulting from the beet sugar industry (and it is only these benefits that deserve serious consideration) like the benefits from any other great industry, are proportionate to and commensurate with its disbursements, but with this additional advantage there is an indirect benefit to our farming community distinct from the profits directly derived from the raising of beets, due to the methods of husbandry the crop entails.

Increased soil production is due to intensive soil cultivation. The desirability of increasing our soil production is, I am sure, recognized by all; but the urgent necessity of increasing its productivity for economic reasons, is recognized by a few, but it is not generally understood, except by our better farmers, that increased productivity, however greatly desired, is possible of attainment only through intensive soil cultivation coupled with systematic crop rotation and that the former is economically practicable and therefore possible, only by the growing of row crops, such as potatoes and beets; the indirect benefits, therefore, from beet culture, must be apparent to all.

For the purpose of affording a comprehensive notion of the magnitude of the beet sugar industry and its importance, I submit below some figures, which I know will be of interest, because they represent the enormous local cash disbursements annually made in **Northern Colorado** by your local sugar factories and this **within a 25-mile radius,** embracing the territory of the Eaton, Greeley, Windsor, Fort Collins, Loveland and Longmont factories.

Unfortunately, for the purpose of this article, our 1914-15 campaign is not yet completed, hence, statistical data for the current campaign has not yet been compiled, so the data given below, except insofar as it relates to the

beet crop, which is for the season of 1914, represents the cash disbursements on the items given for the previous fiscal year.

Annual cash disbursements covering some of the main items of the six Northern Colorado factories, to-wit: Eaton, Greeley, Windsor, Loveland, Longmont and Fort Collins:

Total amount paid growers for beets, season 1914 by the above factories (921,316 tons at $5.72 per ton) $5,269,439.08
(Of which amount Weld county growers received $3,500,000.00).

Disbursements for factory labor (campaign 1913-14) $1,317,384.50
(Equivalent to daily factory pay roll for each working day in the year of $4,305.00).

Disbursements for freight for fiscal year (incoming and outgoing) exclusive of sugar $759,304.44

Freight, inclusive of sugar (est.) $1,571,099.94

Carload shipments (incoming and outgoing) for fiscal year ending Feb. 28th, 1914:

Item	Car loads	Total car loads
Beets	26,140	
Coal	3,532	
Coke	308	
Lime Rock	1,777	
Sugar	5,579	40,156

The above items represent a portion only of the main items of expense and does not include such items as sugar bags, filter fabrics, miscellaneous factory supplies, factory repairs, maintenance and items of that character, which represent upwards of an additional million dollars or more annually.

Let us now analyze the above statistics to ascertain the number of people that are locally engaged in and supported entirely or in part in our own section by this industry, in order that we may more fully comprehend the community benefits.

Factory Labor: Average number of employees during factory campaign 2585
(Of this number 544 were engaged throughout the year).
Number of Beet Growers: (Engaged in raising crop) 3520
Field Laborers (Required for tending crop)..... 8489
(Est. one worker to each 7 acres)
Teamsters and Other Field Labor: (Engaged in cultivating, harvesting and delivering crop, exclusive of beet workers) 2420
Total 17014

In addition to the above, from 200 to 250 coal miners are employed in mining coal to supply the above factories during the campaign. Employment is also afforded to the equivalent of 250 men quarrying and loading limerock for the above factories for a period of from three to four months.

It will be noted, therefore, that this industry affords employment for part of or the entire season to 17,489 breadwinners in Northern Colorado and that this figure is exclusive of the additional help required by the transportation companies in moving beets and factory supplies.

Perhaps an illustration may better enable us to comprehend the carload shipments given above, which would be equivalent to a train 319 miles in length or a string of wagons (estimating 3 tons to the load) 2, 028 miles in length.

It is marvelous when one stops to realize that all of this business originated within a little circle of country, the radius of which is not to exceed 25 miles.

There is another phase that is deserving of mention and that is the stock feeding industry, which has been developed since the beet factories were located in Northern Colorado, by reason of the value of beet tops as a forage and also the factory by-products, pulp and molasses, which constitutes an excellent ration for cattle and sheep feeding.

In northern Colorado, our records show that the following number of cattle and sheep were finished on these by-products, in combination with alfalfa, or at least that these by-products constituted one of the principal rations:

Factory	No. Head Cattle	No. Head Sheep	Tons Pulp	Tons Molasses
Eaton	4975	63850	29075	2321
Greeley	5504	35456	27465	2361
Windsor	3577	5000	20420	637
Fort Collins	12660	32445	90212	2846
Loveland	6248	15300	66878	1067
Longmont	19000		81607	2280
Total	51964	152055	315657	11512

Must it not appear from the foregoing to any thoughtful person that the destruction of the industry would seriously cripple the prosperity of Northern Colorado and other localities of Colorado and the west, where factories are located or beets raised.

Would it not appear also that when the economic phases of the industry have been studied by our national law makers, with the same care and intelligence given the subject by European countries, that the main concern of this nation would be, how, by wise, legislation, the industry could be expanded, rather than how much tariff could be removed, without entirely eliminating all profit to the beet raiser and the sugar manufacturer.

DAIRYING

W. L. McCaslin

In selecting the subject for this discussion, I am conscious of the fact that what I do not know about dairying would make a good sized book. However, I am quite familiar with the products of the dairy after they are on the table, and I am also familiar with dairying from an economic standpoint.

Our local creamery is now getting about 12,500 pounds of milk per day, or its equivalent, which represents the product of about 1500 cows. There is also a considerable amount of sweet milk and cream shipped to Denver daily from the various stations contiguous to Longmont, which

would probably represent, with the above, 2,000 cows now being milked in the vicinity of Longmont.

I feel that dairying in Northern Colorado is a coming industry, and should be encouraged, and it is with some satisfaction that nearly every day some of my friends discuss with me the advisability of putting in milch cows. It shows their interest, and also that we are in a quiet way getting into dairying.

A great many of our farmers object to keeping milch cows, owing to the hard work and drudgery connected with the business. It is very hard to get hired men who are willing to milk cows, and on the whole, it is no "soft snap," but is it any harder to maintain a small dairy than it is to do anything else that you make a success of? I think not, especially under the modern methods of separating and marketing cream. Then if we are to maintain the fertility of our soil and make it pay a reasonable rate of interest on its present value, it is imperative that we feed a large part of the roughage we grow on the farm.

If there were more milch cows around Longmont, we would not now be concerned about the large amount of good alfalfa hay now in the farmers' hands and almost unsalable at any price. Then again, the farmer who is milking a few cows, as a rule is either paying cash for his living expenses or at least paying his bills monthly, and not running up a big bill at the store that takes a large share of his grain or beet crop to meet. The man who seeks a loan, desiring to invest the proceeds in milch cows, has the preference over one who wants to invest in other classes of stock.

A dairyman told me recently that a good cow would pay for herself in one year. I do not know anything that will equal this. I am very sure that neither cattle nor sheep feeding will do it, and there is no other business to my knowledge that will. The milk or cream check that you get each month not only pays your current expenses, but the manure that you are making, if properly conserved, is increasing the fertility of your farm.

Colorado's Farmer Congress

C. L. Hover, President

Five years ago the Colorado Farmer's Congress was organized for the purpose of accomplishing very necessary ends, ends of such a nature that it was hardly possible for any existing farm organization to undertake. We needed and still need certain kinds of legislation to aid in developing our agricultural resources. The minority of the farmers in our state legislature makes it impossible to pass farm legislation by reason of the preponderance of the farmer vote. It will be generations, perhaps, before farmers will hold the balance of power in our state legislature so some other way out of the difficulty had to be found and the only other way that seemed feasible, was to educate the public to the needs of agriculture in a way of helpful legislation. This was one of the conditions that led up to the organization of the Congress.

All other farm organizations can do much along this line but they are hampered by the fact that they do not include in their membership all the farming population. It seemed necessary, therefore, to create an organization that represents all farm organizations and all farmers outside of organizations and this has been accomplished in the formation of the Colorado Farmer's Congress.

With the organization of this Congress came an opportunity to give publicity to its work. Its proceedings are published in every daily paper in Colorado and in a large majority of our weekly papers. As a consequence the public is fast coming to understand, that the voice of the Congress is the voice of the farmer, as near as it is possible to obtain that voice. It was very reasonable indeed for the organizers to assume that the attitude of the Congress regarding legislation pertinent to agriculture would carry decided weight with members of our state legislature, that its opinions, instead of offending our law mak-

ers, would be welcomed by them as conveying accurate knowledge of agricultural conditions and legislative needs. As the Congress grows and expands, the wisdom of the organizers becomes more and more apparent.

But this is not the only reason for its existence. It brings farmers from all sections of the state together in a session where they can discuss conditions and the nature of reforms that conditions demand. Its sessions, always held at the Agricultural college, enables the farmers to become acquainted with the college, its usefulness, its methods of handling our young men and women, its power to aid and assist the farmer. On the other hand, it brings the faculty in contact with the farmer and aids them to keep abreast of his viewpoint as it changes from year to year. Mutual criticism is possible and is always helpful when offered as a forerunner of a constructive, but not a destructive policy.

This year the Congress holds its sessions the entire week of Jan. 11th, and, temporarily at least, it has absorbed the short course. Many noted men from within and without the state will address its sessions. There will be an intellectual feast that no farmer, who can afford the time, can afford to miss. Entertainment also is provided in the way of music, inspection trips, and illustrated lectures.

Every farm organization should be particular to send its delegate and all farmers not delegates are especially invited and urged to attend as the congress will extend to them all the privileges of accredited delegates. Come, bring your families and enjoy a well earned week's rest and recreation. Here you can mix pleasure with instruction and, if human experience counts for anything, after it is all over you will return to your homes refreshed, strengthened and in a frame of mind that lightens burdens and removes cares and with a profound sense of feeling that it has been time and money well spent.

Corn Smut and Its Control

From U. S. Agricultural Department Bulletin

Wherever corn has been grown for a period of years the well known disease known as corn smut will be found to have established itself. Its distribution therefore, is very wide. Considerable losses, sometimes averaging as high as five per cent are sustained by American corn growers, and not infrequently the losses in some sections of the country run as high as twenty-five per cent.

The corn smut disease is caused by a parasitic fungus, which produces its spore masses in the form of smut boils in the ear; along the stalk, particularly at the nodes or joints and less frequently within the leaves and tassels. These boils or spore masses are surrounded by a membrane of fungus tissue mixed with cells of the host. Upon drying out large numbers of microscopic roundish spohrs are liberated, these are capable of retaining their germinating power over winter or longer. They germinate readily in water or on any suitable moist medium and produce great numbers of minute secondary spohrs which are easily carried by the wind from one part of the field to another, or from field to field.

Careful conducted experiments covering several years of research both in America and Europe indicate that corn smut infection takes place at the time or times following the appearance of the host plant above the ground and may develop in any delicate growing part of the corn plant. Usually no evidence of infection is noticeable until the plant is a foot or more high.

Unlike oat smut or the stinking smut of wheat, or the covered smut of barley, corn smut cannot be controlled by any known method of seed treatment. Infection apparently does not take place at the time of sprouting nor for some time following the appearance of the young plant above the ground. From the nature of the type of infection it is therefore obvious that the disease can be controlled only by the removal and burning of the smutted

stalks. This method, however, is practicable only when corn is grown on a limited scale.

There seems to be considerable difference of opinion as to the effect produced upon cattle or other stock when fed upon corn or corn fodder containing smut. It is doubtful, however, whether corn smut ever produces any direct toxic or poisonous effects upon animals eating it either with grain or fodder. It is not unlikely, however, that an excessive amount of the spohrs may mechanically effect the digestive functions, and in this way cause sickness.

The office of Cereal Investigations at the present time is engaged upon an exhaustive study of obscure or unknown points bearing upon the life history and physiology of smut organism. Experiments will be carried on relative to the best methods of controlling this wide spread disease.

Influence of Previous Crop on Beets

H. Mendelson

In our experimental field under the supervision of Mr. Maxson at Longmont, we have studied for several years the influence of the previous crop on the following beet crop. We have six different treatments, each applied on three plots as follows:

1. Beets after beets each year without manure.
2. Beets after beets each year with about 20 tons of feed yard manure per acre.
3. Beets after beets each year with about 20 tons feed yard manure and 200 lbs. phosphate and 200 lbs. nitrate per acre.
4. Beets alternating with wheat with about 20 tons feed yard manure per acre.
5. Beets after alfalfa.
6. Beets the second time after alfalfa.

The following table gives the results as obtained up to date:

ROTATION PLOTS LONGMONT 1911-1914

	1911	1912	1913	1914	Av. to Date	Av. 13-14
% Sugar						
1. Beets af. beets, no man.	16.65	15.10	14.23	16.24	15.56	15.24
2. Beets af. beets, man.	16.76	12.78	11.34	14.51	13.85	12.93
3. Beets af. beets, man & min	16.90	14.32	13.14	14.80	14.79	13.97
4. Beets af. wheat, man.	——	13.08	12.85	14.97	——	13.91
5. Beets af. alfalfa	——	——	12.55a	14.13	——	13.34
6. Beets af, alfalfa 2nd yr.	——	——	——	15.76c	——	*14.16
Average 1, 2, 3.	16.77	14.06	12.90	15.18		
Tons of Beets Per Acre						
1. Beets af. beets, no man.	22.3	13.2	12.9	16.7	16.3	14.8
2. Beets af. beets, man.	24.3	16.5	15.6	23.6	20.0	19.7
3. Beets af. beets, man & min.	23.0	15.3	15.4	22.4	19.0	18.9
4. Beets af. wheat, man	——	16.4	12.7	24.7	——	18.7
5. Beets af. alfalfa	——	——	12.6a	20.7	——	16.7
6. Beets af. alfalfa 2nd yr.	——	——	——	20.7c	——	*16.9
Average 1, 2, 3.	23.2	15.0	14.6	20.9	18.4	
Lbs. Sugar Per Acre						
1. Beets af. beets, no man.	7440	3990	3670	5420	5130	4550
2. Beets af. beets, man.	8150	4217	3520	6850	5687	5190
3. Beets af. beets, man & min.	7780	4380	4040	6620	5705	5330
4. Beets af. wheat, man.	——	4280	3260	7380	——	5320
5. Beets af. alfalfa	——	——	3160a	5860	——	4510
6. Beets af. alfalfa, 2nd yr.	——	——	——	6520c	——	*4840
Average, 1, 2, 3.	7790	4196	3746	6296	5507	

*—average of a and c.

The field on which these plots are located had several beets crops before 1911. It is a sandy loam of rather good fertility, but inclined to crust very badly after heavy rains.

The methods of farming followed the usual practice. The results are ascertained with as much accuracy as possible.

1. % of Sugar in the Beet

A. Beets after Beets.

The % of sugar in the beet on the plots **where beets follow beets,** regardless of the manure used, were higher in 1911 than in any succeeding year. In the three years since 1912 the unmanured plots were always the highest,

followed by the plots with manure and mineral fertilizer. The lowest always manure alone.

The decrease in % sugar as compared with the unmanured plats was---

	By manure	By manure and minerals.
1912	---2.32%	--- .78%.
1913	---2.89%	---1.09%.
1914	---1.73%	---1.44%.

Comparing 1911 with 1914 alone, both years fairly favorable to a reasonable % sugar production, we find that the decrease in the% sugar was:

Without manure	---0.41%.
With manure	---2.25%.
With manure & mineral	---2.10%.

The conclusion is warranted that raising beets after beets decreases the percentage of sugar in the beet. Very little if no manure; a great deal when as much as 20 tons of feed yard manure is used; not quite so much when nitrate and phosphate is added to the manure.

The deterioration is so much that in years unfavorable to the production of high grade beets, the beets are below the standard fit for manufacturing purposes.

It is, however, an open question whether more moderate quantities of manure would have the same deteriorating effect.

B. Beets after Wheat.

On the plots where manured beets are alternating with wheat the percentage of sugar was regularly less than on the unmanured plots and regularly more than on the manured plots without minerals, while the manured plots with minerals were twice higher and once a little lower.

As compared with the unmanured plots the deterioration was by alternating wheat and beets.

1912	---2.02%.
1913	---1.38%.
1914	---1.27%.

As compared with the manured plots alternating manured beets with wheat the percentage was increased in

1912	by	+0.30%.
1913	by	+1.51%.
1914	by	+ .46%.

However in 1912 and 1913 the percentage was below the standard for manufacturing sugar.

C. Beets after Alfalfa.

Beets without manure following alfalfa were in both years lower in percentage of sugar than the unmanured plots.

In 1913 ---1.68%.
In 1914 ---2.11%.

They were lower than beets with manure and minerals.

In 1913 ---0.29%.
In 1914 ---0.67%.

In fact these plots were the lowest of all in 1914, while in 1913 only the manured plots were lower.

Beets the second time after alfalfa were only raised in 1914 and had the second highest percentage. One year's results, however, are not enough to warrant any conclusions.

The following facts seem to be established:

1. That raising beets after beets without manuring produced the highest per cent of sugar.
2. Raising beets after beets with 20 tons manure per acre produced the lowest per cent of sugar.
3. The addition of nitrates and phosphates to the manure lessened the deterioration by manure alone.
4. Rotation of manured beets and wheat produced less deterioration than raising beets after beets with manure, although it does not produce higher beets than the addition of mineral fertilizer to the manure.
5. Beets preceded by alfalfa are on the average a little higher than manured beets, but lower than the others.

However, as the desirable aim is the production of the largest amount of sugar per acre in the most concentrated form the % sugar is not the main criterion to judge the different treatments by.

II. Yield of Beets Per Acre.

A. Beets after Beets.

The soil of these plots was originally very fertile producing in 1911 after several crops of beets still 22.3 tons per acre. The yield per acre visibly fluctuates a great deal on account of more or less favorable seasons. None

of these plots reached the yield of 1911 again. However the yield decreased from 1911-1914---

On the unmanured plots	---5.6 tons
On the manured plots	---0.7 tons
On the manured & mineral plots	---0.6 tons

Each year the manure with or without minerals increased the yield over the non-manured plots.

Increase	By manure	By manure & minerals
1911	+2.0 tons	+0.7 tons
1912	+3.3 tons	+2.1 tons
1913	+2.7 tons	+2.5 tons
1914	+6.9 tons	+5.7 tons

The decreasing fertility of the unmanured plots and the increasing fertility of the manured plots finds its expression in the fact that the increase by manure was the largest in the 4th year of the experiment. However, this might also be explained by the well known fact that manures have their best effect only in favorable seasons.

Although the unmanured plots in 1914 still produced 16.7 tons with 16.24% sugar, a crop with which many farmers are well satisfied, it shows that the same ground with the same treatment and water could have easily produced 6 tons more by application of sufficient manure.

Evidently our fields have not started to approach the maximum production possible by manuring, at least as far as the tonnage is concerned.

A most remarkable fact is that the addition of an easily assimilated fertilizer like nitrates and phosphates actually decreased the tons harvested each year, although it increased the percentage of sugar.

An explanation of this fact is somewhat difficult. The increase in % sugar we believe to be due to the application of phosphate, as this has been proven by some other experiments. At any rate not much can be expected from the application of mineral fertilizers such as nitrates and phosphates. Previous experiments have shown us that potash or the combined fertilizers as produced by the packing houses promise no benefit whatsoever.

If we assume a sliding scale with prices regulated by tenth of per cent instead of half per cent as is customary

now the following are the financial results for the average of the four years:

	Tons per A.	Sugar %	$ per ton	$ per A.
Beets after beets, no man.	16.3	15.56	5.65	91.08
Beets after beets, man.	20.0	13.85	5.21	104.20
Beets after beets, man & min.	19.0	14.79	5.45	95.45

Under the circumstances the application of 20 tons manure per acre produced on the average $13.12 more gross receipts than the unmanured plots. Out of this has to come the extra cost of hauling the increased tonnage of beets and the cost of applying the manure, so that the margin left would not be very big, presumably around $5 per acre per year. Nevertheless this is 10% interest on $50.

If, however, the same system of raising beets were continued another four years the margin would be considerably more as the unfertilized land must decrease in production.

B. Beets Manured after Wheat.

The yield of these plots compared with beets after beets without manure is evidently influenced a great deal by seasonal circumstances, presumably rainfall conditions.

Increase or decrease in tons per acre compared with beets after beets---

	without man.	with man.	with man & min.
1912	+3.2	--- .1	+ .9
1913	--- .2	---2.9	---2.7
1914	+8.0	+1.1	+2.3

1914 had the largest rainfall in spring as well as during the winter. It is doubtful whether such a combination happens oftener than once in ten years. As it was, the plot rotated with wheat was the only one exceeding in 1914 every crop raised in 1911. It must be taken into consideration also that these plots have received manure only every other year. It, therefore, seems that with favorable rain conditions and a limited amount of manure raising beets after wheat promises to maintain the productivity of the soil as far as tons per acre are concerned.

C. Beets after Alfalfa Without Manure.

Frequently it is asserted that the productivity of our

beet fields can be maintained by rotating wih alfalfa.

Increase or decrease of yield after alfalfa compared with

	Beets after Beets without man.	Beets with man.	Beets after Wheat with man. & min.	with man.
1913	--- .3 tons	---3.0 tons	---2.8 tons	--- .1 tons
1914	+4.0 tons	---2.9 tons	---1.7 tons	---4.0 tons

In the unfavorable season, 1913, the alfalfa beets yielded less, in the favorable season, 1914, yielded considerably more than the unmanured plots, but less than manure, with or without minerals and after wheat. At least on these plots rotating with alfalfa did **not** maintain the productivity of the soil as the application of manure did.

III. Sugar per Acre

This next to the percentage of sugar is the important criterion of the productivity, as a crop with a high percentage of sugar and a low tonnage is unprofitable to the farmer, while on the other hand a large crop with a low per cent sugar would be unprofitable to the factory. The industry cannot be maintained for any length of time unless both parties profit by it.

A. Beets after Beets.

None of the plots produced as much sugar in 1914 as in 1911. The decrease was---

Without manure	---2020 lbs.
With manure	---1300 lbs.
With manure & minerals	---1160 lbs.

It must not be concluded that the fertility of the soil is permanently impaired on the manured plots by four successive crops of beets as we have no means of knowing how much of this decrease is due to the influence of the season. Nevertheless it is significant that the decrease in sugar production was the smallest on the plots receiving nitrates and phosphates with the manure. Somewhat puzzling is the irregular action of these commercial fertilizers. They influenced the sugar production as compared with the plots receiving manure only.

1911	---370 lbs. per acre.
1912	+170 lbs. per acre.
1913	+520 lbs. per acre.
1914	---230 lbs. per acre.

Professor Headden at Fort Collins obtained similar puzzling results. We therefore must admit that we do not know much yet about the action of these ferilizers.

We are inclined to believe from other experiments that phosphates alone with manure will furnish a favorable combination which while not influencing the tonnage will maintain a higher percentage of sugar.

However, before advocating the use of this fertilizer on a large scale, its effect must be studied on various fields and even then the financial effect must be considered. An application of 200 lbs. per acre, which may be considered the minimum effective dose, would mean an expenditure of at least $4 per acre. In order to pay for this on the basis of the present sliding scale it would have to raise the price per ton of a 10-ton crop 40c, or a 15-ton crop about 30c, and a 20-ton crop about 20c. It is self-evident that a profitable use can be predicted only on fields naturally yielding a high tonnage.

A remarkable fact also is that in 1913 on the plots continuously cropped with beets the one with manure alone produced the lowest yield of sugar per acre mainly due to a very low percentage of sugar. This is, of course, a most unfavorable combination. It is again an open question whether more moderate application of manure would have produced better results.

B. Beets manured after Wheat.

The rotation with wheat influenced the yield of sugar per acre compared with---

	no manure	manure	manure & min.
1912	+290 lbs.	+ 70 lbs.	+100 lbs.
1913	---410 lbs.	---260 lbs.	---780 lbs.
1914	+1960 lbs.	+530 lbs.	+760 lbs.

In 1912 and 1914 the rotation increased the production, particularly in the last year where the beets after wheat was the only plot approaching the yields of 1911. The deficiency of 1913 was due to both a low tonnage and percentage. During this season with limited rainfall these plots suffered during the heat noticeably more than the others. This is to be expected as, of course, the previous wheat crop does not receive nearly so much irrigation water as the previous beet crop. This must be taken into

account if beets and wheat are to be rotated. The moisture in the soil should be preserved by discing immediately after the wheat harvest and, if possible, fall irrigation should be practiced.

The average of the last two years shows that rotating with wheat produced nearly as much sugar per acre as the continuously cropped plots with manure and mineral fertilizers and about the same percentage of sugar, also 130 pounds more sugar per acre and about 1% more sugar than the continuously cropped plots with manure alone.

1913-1914 average of wheat rotation compared with---

Beets after beets, no man.	+770 lbs. sug.	---1.33% sug.
Beets after beets, man.	+130 lbs. sug.	+ .98% sug.
Beets after beets, man & min	--- 10 lbs. sug.	--- .06% sug.

C. Beets after Alfalfa.

In 1913 the yield of sugar per acre was the lowest on all plots due both to low tonnage and % sugar. In 1914 the unmanured plots were the only ones lower. On the average of the last two years the alfalfa rotation compared with---

Beets af. beets, no man	--- 40 lb. sug. per A.	---1.68% sug.
Beets af. beets, man.	---680 lb. sug. per A.	+ .41% sug.
Beets af. beets man&min	--820 lb. sug. per A.	--- .63% sug.
Beets af. wheat, man	---810 lb. sug. per A.	--- .57% sug.

It certainly cannot be said that rotating with alfalfa in the first year produces satisfactory results either as to quantity or quality.. Considering the results of the wheat rotation it seems more promising to plant wheat after the alfalfa, manure and then plant beets.

It is also evident that the rotation with alfalfa did not increase essentially the yield of sugar per acre as compared with the continuous cropping without manure but decreased the percentage of sugar very much. Not quite so much as manure but neither did it raise the yield.

Rotating with alfalfa then in these experiments did **not** replace the beneficient effect of manure as to the increase in yield but approximated its deteriorating effect on the percentage.

The second year after alfalfa beets were raised only in 1914 and it is unsafe to go by only one year's results. Nevertheless it is significant that the yield of pounds sugar

per acre was higher than that of beets after alfalfa by 660 pounds and the percentage by 1.63%. Even here the quantity did not come up to that raised by manure while the improvement in quality is pronounced.

If we take the average of the crop after alfalfa in 1913 and the second crop in 1914 and compare it with the two year averages of the other plots then the average of the two crops after alfalfa compares with---

Beets af. beets, no man.	+290 lb. sug. per A.	---1.08% sug.
Beets af. beets, man	---530 lb. sug. per A.	+1.23% sug.
Beets af. beets, man&min	--490 lb. sug. per A.	+ .19% sug.
Beets af. wheat, man	---480 lb. sug. per A.	+ .25% sug.
Beets af. alfalfa 1st yr.	+330 lb. sug. per A.	+ .82% sug.

This demonstrates the well known experience that at least two crops of beets have to be raised on newly broken alfalfa to make it pay. But while the average quality and quantity is improved the quantity does not come up to that produced by continuous manuring.

Summary

It should be kept firmly in mind that results of a series of experiments like the above are applicable only to the conditions of the soil, climate and treatment under which they were made. Broad general conclusions can be made only with great care and caution.

Similar experiments carried on at Sterling, Colo., and Edgar, Montana, have given results differing somewhat from those at Longmont.

At the other places it was also found that raising beets after beets with manure depresses the percentage, but nothing like at Longmont. Also raising beets after grain did not lower the percentage in the same degree.

With these limitations the following may be said:

The plots used were cropped several years before the experiments began. In the last four years of continuous beet raising neither the yield of sugar per acre nor the percentage of sugar was as great the last year as it was the first year regardless of the manure and rotation used.

In the last three years no treatment produced as high testing beets as the unmanured plots. The deterioration in sugar percentage was particularly marked on the plots

receiving 20 tons manure alone every year and on beets following alfalfa.

The addition of 200 lbs. nitrates and 200 lbs phosphates to the manure produced every year higher testing beets than manure alone. This would not have been the case if the low tests of manured beets and alfalfa beets were due to excess of nitrogen alone.

The beets rotated with wheat receiving 20 tons manure every other year tested higher each year than those with continuous application of manure alone, although generally not as high as those receiving nitrates and phosphates

It is probable that the application of 20 tons manure every year is excessive. This fact, while theoretically interesting, is practically unimportant because hardly any farmer has sufficient manure for such excessive manuring.

The yield of sugar per acre has been increased every year by the application of manure with the exception of 1913 where on the plots with manure only and following wheat the percentage of sugar was too low.

It is significant that the last year of the series the plot rotated with wheat produced the highest yield of sugar per acre with a higher percentage of sugar than the plots continuously manured.

Alternating beets and alfalfa does not produce the increase in sugar per acre that manuring does and is unsatisfactory in percentage also.

Raising two crops of beets after alfalfa produces a better quality of beets but does not increase the average quantity up to that produced by the application of manure.

While statistics of succeeding five year averages in Germany show clearly an increased production of sugar per acre mainly due to an increase in per cent sugar, nothing like this is visible in Colorado, although we probably use a higher grade of seed than the German average.

The highest per cent of sugar was obtained in 1907—a level never reached since.

As long as a protective tariff or extraordinary occurrences like the European war maintain high sugar prices a deterioration in quality is not so serious. But if the business has to be conducted with a low level of prices brought about either by world overproduction or low tar-

iff a deterioration in quality is a serious menace to the industry whether the larger share of the profits goes to the farmers or to the factory, because there will be years where there will not be any profits.

The question of maintaining or increasing quantity production without essential deterioration of quality is the most important primary problem facing the beet sugar industry.

Stock Market Letter

Ben Kemper, Denver Livestock Commission Co.

The year of 1914 is about to close. There has been a great many things that have come up that have interfered with the markets. Notwithstanding this, we certainly have had a good market on cattle and prices are closing up in very good shape.

The receipts of cattle for the year at the five big markets show about seven hundred sixty thousand head of cattle short of the year of 1913 and nearly one million, five hundred thousand head short of the year 1912. This certainly shows that there is a marked shortage in marketable cattle in the cattle country.

The demand for beef, I think, will be better the next five months than it was one year ago. We will have more or less out-let for exports and I do not think our imports on beef will be as heavy as last year. The consequence is, I predict, higher prices for matured cattle of all kinds. Of course there are a great many things that might come up in the meantime that will change the situation, but the present outlook looks very encouraging to the feeders in Colorado for the coming year. With seasonable weather the balance of the winter and spring, I see no reason why the feeders should not realize a legitimate profit from their cattle.

The foot and mouth disease in the eastern states that has prevailed in the past six weeks is under control by the government and I think it will only be a thing of the past in a short time. This of course will stimulate feeders feeding cattle after the first of the year.

The Beet Root-Louse

Asa C. Maxson

What Is It?

The beet root-louse is a very small insect belonging to that group of insects known to science as the suborder Homoptera, family Aphididae. The popular name applied to these creatures is plant lice or aphids.

Where Do They Live?

As may be implied from the name, beet root-louse, this pest lives on the roots of sugar beets and other plants such as lamb's quarter, door-mat grass or knot grass, and several other wild, native species. The above statement is true of one form of the lice, however, there is another form which lives a part of the year on the narrow leafed cottonwood trees where they produce galls on the leaves.

How Do They Feed?

Unlike the grasshopper, alkali beetle, potato beetle and other biting insects plant lice do not devour the tissue of the plant upon which they feed. Instead of the biting mouth parts of the insects mentioned above these insects have what is called a beak and with which they pierce the tissue of plants and through which they suck the sap of plants in much the same way that mosquitoes suck the blood of animals.

What Effect Do They Have on the Beet?

The beet root-louse attacks the fine feeding roots of the beet and in this way intercepts the sap as it is being carried from the ground to the leaves where it is to deposit the plant food it contains and which goes to make up the tissue of the beet. In this way the lice actually cause the beet to starve just in proportion to the degree in which they extract the sap from the root. A beet harboring but a few lice will show very little effect, on the other hand, one badly infected will be sickly in appearance, stunted in growth and poor in sugar. In some cases the beets have been known to die as a result of the feeding of the root-lice but this condition is seldom seen.

How Can the Farmer Fight This Pest?

Studies of remedies for the beet root-louse have been conducted by some of the Agricultural Experiment stations, especially that of Montana, and by the writer, but so far not much progress has been made further than to reduce the amount of infection by certain cultural methods.

Since the beet root-louse lives below the surface of the ground it will be easy to appreciate the fact that the use of poisons in the form of sprays have no value in fighting this pest. Further, the fact that this insect does not eat the tissue of the plant, as has already been mentioned, spraying the plant will not kill it as it does not take any of the poisoned part into its somach. The only sprays which are effective in fighting this and other sucking insects are those known as contact poisons. These kill by closing the breathing pores and irritating the body walls of the insect, therefore, they must be placed on the insect to be killed. It would be seen at once that this is impossible in the case of an insect living below the surface of the soil.

Field observations and experiments show that the beet-root louse can be controlled to quite a degree by plentiful and timely irrigation. To illustrate this I will mention an observation which was made on our irrigation plots on the experiment farm east of the sugar factory at Longmont. This experiment was not conducted for the purpost of testing irrigation as a means of controlling the beet root-louse, however, the results suggest this as a means. The experiment mentioned was for the purpose of determining the effect of different amounts of water when applied to fields having close and wide stands of beets. At harvest time it was noticed that those plots which were irrigated but once were very much more infected with root-lice than those which had been treated in exactly the same manner with the exception that they were irrigated four times. This difference appeared where the plots had a close stand as well as in the case of

those with a wide stand. It is very possible that the time of irrigation may have an influence. This is being tested by Mr. Parker, of the Montana Agricultural Experiment station, on the Experiment Farm of the Great Western Sugar Co., at Edgar, Montana, with what appear to be promising results.

Rotation of crops is of no avail in controlling the beet root-louse. It is a well known fact that alfalfa fields are very apt to be badly infected with this insect the first time beets are grown on them. The same is true of stubble ground. A very close examination of many alfalfa fields has not revealed a single beet root-louse on the roots of the alfalfa. That they may be found on the roots of weeds in alfalfa is very probable but the number of lice on them would not be sufficient to cause the degree of infection often noted in these fields. What seems very much more probable is that such fields are free of the natural enemies of the beet root-louse, (these will be mentioned later) and this lack of natural checks allows them to multiply without disturbance until they over-run the field.

In proof of the statement just made regarding crop rotation I will mention the plots already mentioned above. The last crop of beets on this field was in 1911. The spring of 1912 it was sown to alfalfa without a nurse crop and the third cutting plowed down. In 1913 this particular piece of ground was summer-fallowed, so that the greater part of the season there was no growth at all on it. As mentioned, this year certain parts of this field were as badly infected as I have seen on the experiment farm since it was established in 1910.

So far as our present knowledge indicates, relatively early irrigation and plentiful irrigation both of which appear to be unfavorable to the rapid development of the beet root-louse is the only practical remedy. Further study may reveal other effective means of control.

Natural Enemies.

Luckily for all concerned nature has made provision for the control of all forms of life, which under natural conditions is very effective. When we come to study animal and plant life with reference to the relation of one

species to another and to its environment we discover a vast scheme of checks and balances which has come to be known as the "balance of nature." Man seems to be the one great agent which is active in throwing nature out of balance.

Let us consider how the balance was destroyed which resulted in the beet root-louse becoming a pest. The beet root-louse has been a part of the insect life of the western United States undoubtedly for untold years. Before the advent of man the number of lice developing during the summer was controlled very largely by the abundance of plants on whose roots they could live. The remaining portion of the balancing was done by the natural enemies. Advent man, followed by the sugar beet industry. With the planting of thousands of acres of sugar beets the breeding grounds and conditions were made so much more favorable than previously that the root-lice were produced by thousands and hundreds of thousands. At the same time the conditions for the development of the natural enemies were not improved outside of furnishing them with more food. These two facts soon resulted in the wide spread distribution and increase of the beet root-louse as it came to be known after beets became a part of our cropping system. Other cases could be mentioned where man has been the direct cause of destroying the balance of nature and a pest was made of what was before an inconspicuous insect. The Colorado potato beetle is a well known example.

Among the natural enemies of the beet root louse we have several species of flies, lady beetles, bugs and parasitic fungi.

Syrphus flies and a little black and yellow fly called Chlorops assimilis, feed on the root-lice in the larval stage. Two species of lady beetle larvae have been observed feeding on this insect. A small Capsid bug feeds on them in the galls on the cottonwood trees and the fungus disease, Empusa ahpidis, kills many of them in the soil. Further study of the natural checks will undoubtedly reveal other insect and fungus enemies.

Life History.

So far as known, the life history of the beet root-louse is as follows: During the winter, if one examines the bark of the narrow leafed cottonwood trees, many very small yellow eggs which are more or less covered with a whitish cottony substance, will be found. These are hard to see with the unaided eye. These eggs hatch during the latter part of April and early May. As soon as hatched the little louse, which is called the larva, goes wandering about until it finds a young leaf when it locates on the upper side of it and begins to feed by forcing its beak into the leaf and sucking the sap. Its feeding so irritates the leaf that an abnormal growth in the form of a slight depression, at first, and later in the form of a semi-globular swelling on the under side of the leaf results. This swelling is hollow and the little louse will be found inside where it is protected from all harm, apparently. As this larva grows it sheds its skin several times. Finally when it is fully grown it begins to give birth to young. At this stage it is no longer called a larva but is called the stem mother or queen mother. A single stem mother will give birth to several hundred young. All of the young live in the swelling, or gall as it is called, until they get wings. These winged lice are called the migrants from the fact that they migrate to beets and other plants when they leave the galls. These and the stem mother are also called viviparous females, that is to say, they have the power of giving birth to living young instead of laying eggs. No male lice are necessary to the production of these young.

When the migrants find a plant which suits them, such as a sugar beet they deposit their young on it. These young almost immediately crawl down the stem to the ground where they begin to feet on the root. In a very short time these young develop into viviparous females which have no wings. They in turn give birth to young and so on for several generations. The rate of multiplication is so very rapid in all plant lice that in an incredibly short time a field will be over-run with them. It has been estimated that the progeny of a single plant louse

in 100 days will be 3,200,000 individuals weighing about a quarter of a pound. If this were to continue unchecked for 300 days there would be 32,768,000,000,000,000,000 aphids which would equal in weight 1,638,400,000 men or the weight of all the people in China taken seven times. How fortunate that all plant lice do not live to produce their quota of young.

After several generations of lice have been produced on the roots of the beet two forms appear. One is like its parent, having no wings and is a viviparous female. The other is also a viviparous female but develops wings. Another difference between this winged louse and her wingless sister is the form of young that she bears. The wingless one gives birth to other wingless viviparous females while the winged one gives birth to two forms, one true females and the other true males.

The wingless insect mentioned above remains in the soil over winter and is ready to attack any growing plant of suitable variety in the spring. The winged female leaves the beet, flies to a narrow-leafed cottonwood tree and deposits her young. These young which as stated above are true males and females, shed their skin several times and then mate. After mating the male dies and the female deposits a single egg nearly as large as she is and then dies. This egg is the one we started out with. Thus we see that nature has provided this insect with two means of keeping the species alive over winter. One in the wingless, hibernating louse in the soil and the other in the egg in the crevices of the bark of the cottonwood trees.

The question now naturally arises: can the root louse be controlled by destroying the trees? To this it is necessary to give a negative answer. No it is not, for the reason that all of the narrow leafed cottonwood trees cannot be destroyed and if all in the valley and plains were we still have the canons of the mountains which are filed with them and from which the westerly winds would bring hoards of lice in the spring which would infect our fields. The wind will carry these insects for miles, far out into the plains.

Extracts From Annual Report of County Agent

H. H. Simpson

Spraying Results

Considerable time was spent during the past fall investigating the results of spraying for codling moth. Apples were counted in a number of orchards in different parts of the county and the per cent of wormy and clean apples determined. In orchards where no spraying was done the per cent of wormy apples was about 80, with about 50 per cent having worms in the blossom end, while in orchards where spraying was done at time the blossoms were falling, not over 5 and 6 per cent showed end worms. The per cent of side worms is unaffected by the spray at blooming time, and most of these worms entered the apples during the last week of July and the first two weeks of August.

Where the trees were sprayed in May and not given later spraying, the wormy apples were reduced to 60 per cent.

Only one orchard was found where the owner had sprayed the three times and he states that he waited about one week too long for his third spraying, as most of the worms entered his apples during the week before this spray. This has been a good practical demonstration, and teaches us that to produce apples free from worms, we must persistently fight them at the time the eggs are hatching. Orchards that are producing 80 per cent wormy apples, are parasites on the farm and will yield much more profit if put into alfalfa. There is no market for wormy apples.

Co-Operative Demonstrations With Field Crops

During the past year a number of tests were made with the following crops:

Marquis wheat, Early Amber cane, Black Hulled white kaffir, Dwarf Yellow Mile, Feterita, Sudan Grass.

Marquis Wheat

This is a new spring wheat recently introduced from

Canada, and originated at the Ottawa Experiment Station. Ten pounds were received from the agent in the San Luis valley where it has given exceptionally good results, being a heavy yielder and ripening twelve days before any other. The seed was planted by farmers in different parts of the county but because of its not being planted until in May the results were not satisfactory. It will probably be tried again next year.

Kaffir, Feterita, Cane, Milo.

Seed was received from the government of the earliest varieties of these grains, for the purpose of testing them as silage crops on our dry lands. Several farmers co-operated in these tests and some very promising results were obtained.

The following yields of fodder and grain were secured on Gunbarrel hill:

Early Amber Cane---9 tons per acre.

Feterita---7.7 tons per acre.

Dwarf Yellow Milo---6.6 tons per acre.

Black Hulled White Kaffir---5.5 tons per acre.

Corn planted in the same field yielded 5 tons per acre. These grains were planted June 20 and cut Sept. 23, although the first killing frost came on Sept. 13, leaving a growing period of 85 days. In this section the cane matured a good seed crop and the stand was excellent. The feterita stood next in maturity but the stand was very poor owing to a wet, cold soil at planting time, and ferterita being a soft seed will decay under these conditions. Neither the milo nor the kaffir reached maturity, the milo being in a milk stage and the kaffir was just heading good.

In the section of the country northeast of Longmont approximately the same results were obtained with the exception that the milo matured earlier than the feterita. Here, both milo and kaffir gave a good stand, but did not grow as tall as feterita. On Oct. 2, after several frosts the feterita was still standing and green, with large heads, well filled with grain.

Sudan Grass

Only a small sample of this was tried, on the county farm. The land was low and wet, having been flooded by

Boulder creek, and consequently planting was done late. The stand was fairly dense, medium tall, but did not mature seed.

On the whole these experiments were valuable and show that certain early maturing varieties of the Saccharine and Non-Sacharine Sorghums are more certain of making a heavy silage crop on dry lands than corn.

Sudden Deaths in Silo

From Berthoud Bulletin

A recent fatal accident in Ohio calls attention to a danger to farmers which cannot be too widely circulated. Since 1875, when the first American silo was built by Dr. Manley Miles, this method of preserving forage for livestock has been generally adopted. Although the Department of Agriculture has frequently called attention to the danger of carbon dioxide gas accumulating in silos under certain conditions, no fatalities have been reported heretofore. On the morning of September 19, four workmen on the farm of the Athens (Ohio) State Hospital, ascended the ladder on the outside of a silo to an open door about twelve feet from the top and jumped down, one after another onto the silage, the top of which was about six feet below the door. About five minutes later two other workmen following them found them unconscious. Although a large force of workmen were immediately summoned and the bodies of the four men removed at once through a lower door the physicians of the hospital who were at once on the ground were unable to resuscitate any of the four men. Evidently the carbon dioxide gas had accumulated during the night, filling the silo up to the level of the door and forming a layer of carbon gas six feet deep. Such accidents says The Journal of the American Medical association, might easily be repeated on any modern farm. Agricultural journals should call the attention of the farmers to this danger and should urge that silos be carefully ventilated before being entered.

Meteorological Report

November, 1914---

Maximum temperature, 4th and 5th, 75 deg. F.

Minimum temperature, 16th, 14 deg. F.

Monthly mean temperature, 41.3 deg. F., which is about 8 deg. above normal for the month.

Total precipitation, .27 inches, which is about half the normal for the month.

Compared with November, 1913, the mean temperature was 0.7 deg. colder, and there was about one-fourth the precipitation.

THROUGH THE LEAVES

FEBRUARY, 1915

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Agricultural Notes

W. P. Hogarty

On February 1st we had delivered 57,420 tons of pulp and have yet to deliver an allotment of 22,000 tons. It looks quite probable now that this allotment will have to be deduced nearly a ton per acre owing to the pulp lost at the time of the break in the silo and the excess pulp that went out during December. This makes a bad condition as the predictions are that the beef market will not be good for from 30 to 40 days, and I would advise feeding more syrup and cake so as to lengthen the feeding period. There has not been over 50 per cent of the syrup consumed locally this year that there was last season at this time.

+ + + +

Our hay cutter is in operation now and owing to the demand for cut hay it will be necessary for you to call us up before bringing in your product, so as to have a certain hour allotted you. This will save congestion and we can give you far better service.

+ + + +

All of the scale beams of the company wagon scales have been brought in and are in our store room, and in the future when you want to use the scales you will be charged for them at the rate of 25c per day to beet growers and $1.00 per day for non beet growers for the days that the scale beams are in your possession. Our reason for making this charge is that often the beams are not returned promptly when others want to use them, and another object is that it may be an incentive for a group of farmers to club together and purchase their own scales. It does not do a scale beam any good to be carted around as it is liable to get bent and then does not weigh accurately, and if there is any one thing that we want right it is our weights.

+ + + +

The holidays are over and we are thinking about the crops to grow in order to get the greatest net profit. As

this booklet goes to beet growers only, and as nearly 70 per cent of our growers are tenants, it is the tenants' point of view we wish to consider. At the present market price wheat is attractive, but very few of us realized such a price when we had wheat to sell, and what will be the price when we are forced to sell next fall? I hope high, but with the increased production in the United States, Australia and Europe, and no increase in the consumption how can you expect fabulous prices? Then too, there is the element of chance in the wheat crop, such as hail, and rust on spring wheat. Besides, you give the landlord 50 per cent of the wheat crop for the use of his land, water and seed. Alfalfa must be left out of the profit sharing crops. You cannot give 50 per cent of the crop to the landlord and realize a profit on alfalfa. There is only one other crop left on which you can safely take a chance, that is the sugar beet. You are anxious to know what this year's contract is to be and so am I, but don't get your expectations too high. Sugar is not high, neither is there any condition of the present or future that leads us to believe that sugar will be an excessive price. I think the company is going to make a liberal contract and one under which you can make a profit, and while you must be your own judge, I would advise growing crops in about the same proportion as you have done in the past.

+ + + +

We have discontinued our farming operations at Littleton, Colo., and as a result have a surplus of mules and farming tools on hand. Consequently we will sell at private sale before February 20th the following articles:

3 wagons with beet racks;; 1 farm truck wagon; 5 sulky plows; 1 2-gang plow; 1 Spaulding deep tiller; 10 beet drills; 2 beet cultivators (John Deere); 1 corn cultivator (new); 1 corn lister; 1 walking plow; 1 land carder; 1 sub soiler; 1 roller; 1 Ideal beet puller; 2 Moline beet pullers (with riding attachment); 6 moline beet pullers (good as new); 1 irrigating pump; 8 mules; 6 sets work harness.

On February 20th, we will have an auction sale at our company barn of remaining implements. Sale beginning at 10 a. m. Arrangements can be made with Mr. McCreery for terms of payment. 5% discount for cash.

The Effects of the European War on Our Markets

A. D. Holt

When asked by a representative of "Through the Leaves" to answer this question, I felt like the farmer who was asked to locate the particular point in the hay stack where the needle was lost, that is a total inability. Except in a very general way the question is one of the problems of the future, depending largely upon the duration of the war. For six months this "greatest of all wars" has been raging, armies of unprecedented numbers equipped with all the death dealing armaments, and protective armor that modern skill and ingenuity can devise, have fought battles lasting for days, and marched and countermarched, and so far nothing has been accomplished, excepting the killing, wounding and carrying away of prisoners of over two millions of men, and to convince the thoughtful that that magnificent machine "The German Army" is not invincible, but that it can be successfully met by other equally brave and devoted soldiers; and today the issue is apparently as far from settlement as at the beginning, excepting for the loss of human life and the destruction of property. As we watch the reports of successes and counter successes has not the thought come to you that like the battle of two strong and thoroughly trained and equally skillful men in the prize ring, the end comes from an accident or the exhaustion of one or the other of the combatants. Are the terms that will be imposed by the victor such as are likely to cause the vanquished to continue the struggle to the limit of endurance. Prof. Ostwald, a German scientist of distinction during last November outlined the terms that would be exacted of the defeated Allies by the victorious Germans, viz: "A confederation of continental Europe against England and Russia under the presidency of the German Emperor. A prominent English statesman in November last said: "This war must continue until Germany consents to reimburse Belgium

for all her losses, to restore the conquered provinces to France and Denmark, to consent to the re-establishment of the kingdom of ancient Poland and to a general disarmament." With these ends in view it would seem as though the exhaustion of one of the parties to this great war was a necessary preliminary to peace. And while we think that eventually the great weight of numbers that the Allies can bring to bear must be the deciding element. Yet the "Greatest of Fighting Machines" may be invincible for months and perhaps years, when fighting on their own soil in defense of their father land. While not pretending in any way to predict the duration of the war, we certainly cannot look for an early peace, and we will discuss our markets with this probability in view.

At first we note that twenty millions of men have been taken from the ranks of those who are **creating** property and are commanded to kill and to **detsroy.** Millions of men before the war is over will be permanently removed from the ranks of the producers, many of them as cripples will remain a permanent tax on industry, many hundreds of factories will be destroyed, thousands of fertile acres will be overrun and their crops trampled under foot, and while engaged in their work of destruction the men must be fed and the property destroyed that is in the shape of materials of war and transportation must be immediately replaced. We look then for an increased demand upon the neutral world for food stuff suitable for the army viz: such concentrated food as grain and meat as distinct from vegetables, and for all the commodities and manufactured articles that go to make up the equipment of an army. This demand will stimulate production and probably some articles whose production is capable of a rapid increase may be over produced. At least this war cannot last always, and at its end there will be less mouths to be filled, less bodies to be clothed, and less property, work and prosperity to fill these mouths and clothe these bodies and we farmers need to keep in mind that at some time in the comparative near future prices must again resume their normal range. The change may come suddenly or gradually, it may come at the commencement of harvest when the crops are all in the farmers' hands, or it may come

later with disastrous effects to elevators and mills. When prices are abnormally high the wise will be planning to escape with as little loss as possible when the fall comes. Shall we look at the causes that have led wheat to bring the highest price for years with the exception of 1908 when it was $2.15 in Longmont, as against $2.07 at the present time? At harvest it was known that the largest crop of wheat ever grown in the United States was the record of 1914, and prices started at a point below the cost of production. Subsequently it was found that there was a shortage in other countries and the international bureau estimated when it finally appeared, placed the wheat crop of the Northern Hemisphere at 3 per cent below the average. Then came the European war, and England is probably resuming the policy that from fear of possible famine in time of war she has consistently followed for years until about the year 1900, of keeping a year's supply of wheat in her elevators. The war, by closing the Dardanelles, prevented the usual shipment of some 200 to 280 million bushels of wheat from Russia. The Australian crop proved to be short over eighty million bushels, and the Argentina crop was reported damaged by bad weather, and the crops of this country are given the preference because the trip from the United States can be made in much less time than from Argentina, and ships, owing to the war, are scarce.

Now, as to the future, the high prices will stimulate production, Argentina, Canada and Australia have immense bodies of unimproved land that can be devoted to wheat culture, and already the Canadian and Australian papers are urging their farmers to double their wheat acreage for the coming year. From considerations of protection England will probably in the near future replace the years' supply of wheat in her elevators, and will need only the yearly consumption. My thought is that while we farmers are justified in sowing every acre of wheat that we possibly can before the middle of March and to expect remunerating prices, it is not wise to run the risk of late sowing or to interfere with our regular rotation of crops or to seriously cripple other industries connected with our farms. We at Longmont are not as much interested in

corn and oats as in wheat, but the demand for these grains and also for horses must continue abnormal during the war. What shall we say of the market for sugar, or the sugar beet, which is the crop that causes more friction between the grower and manufacturer than all other crops combined. And I am sorry to say that I found on a visit to the east two years ago that the impression was quite generally entertained there that the farmers of Colorado cared very little about the industry, and that they were very indifferent whether the industry was killed or not. And that the Colorado farmers would not consider it a blow aimed at them should the duty on sugar be entirely removed. While in the east I had the pleasure of explaining that this was entirely a mistake to a gentleman high in the council of the Democratic party, and who at that time was a prominent candidate for the position of secretary of agriculture, a gentleman who has made agricultural matters the study of his life-time, and who, if he is correctly reported, says, that though he is a Democrat and believes in a tariff for revenue only he recognized that in the distribution of the Underwood tariff **"the interest of the farmers has been entirely ignored."** We are willing to grant that the Sugar company has not paid in the past the full amount they could for beets and yet make a reasonable profit on their capital invested. We grant that the Farmers Union has been a force in securing an advance in the price of beets, but we raise the question, should the law makers of the east be left in their conclusion that the farmers are not deeply interested in the continuance of the beet sugar industry, and that they will finally resent at the polls any unnecessary attack on an industry so vital to farming in Northern Colorado as the beet sugar industry. My own wishes might be illustrated by the story of an Irishman and his wife who were continually fighting one another. But when an outsider interfered to prevent the wife from receiving a beating, instantly both husband and wife turned on the intruder and he was a lucky man if he escaped with no bones broken. Let us scrap for the highest prices for our beets with the

Sugar company, but let us unite with them in fighting attacks on this industry.

What has this to do with the European war? This same war has so reduced the revenue of our government that it has been found necessary to compel a poor man to pay a tax every time he gives a note, sends an express package, or takes out life insurance to protect his family in case of death. Are we not justified in asking that a part of this war tax be raised in the shape of revenue on sugar produced in countries where land is worth only a few dollars an acre, and the labor is scab labor receiving less than a dollar a day? I venture to make the suggestion that at our Farmers Institute we pass resolutions embodying the thought that as farmers we are deeply concerned in the success and continuance of the beet sugar industry,, and that as farmers we ought not to be compelled to compete with the cheap negro labor in Cuba or the cheap imported laborer in Denmark. Rider Haggard is my authority for the statement that the beet grower in Denmark imports most of the hand labor from Poland and that the remuneration is only about 80c per day with an allowance of a small quantity of rye bread, potatoes and a quart of buttermilk. The amount paid for beets there at the time of his visit was $4.50 per ton. Let us unite to prevent unrestricted competition from sugar produced under these conditions.

The normal sugar crop of Europe is a little over 8,000,000 long tons. In the past year the number of tons produced in these countries now engaged in war was as follows:

Germany	2,728,000
Russia	1,750,000
Austria-Hungary	1,710,000
France	800,000
Belgium	230,000
Servia	6,500

According to the "Sugar Beet," a publication of Toledo, Ohio, of the 71 sugar factories in this country, 59 were operated in 1914.

Pick-ups of 1914

Hugh Scilley

The season that is just past was a very good one, in fact, it was the best for the farmer I have seen in the six years I have been in the state. It was better for the farmer who had fall plowed most of his land than for the man who had to plow in the spring, as it was hard to get a seed bed on spring plowing, especially on heavy land. My observation has been that beets yielded an average of about three to four tons per acre more on fall plowed land, and are of better quality..

I notice that we are learning that the way to make good crops is to feed them, and the man who is aiming to give his crops a full balanced ration is the man who is getting the best yields. Cattlemen know that if they want to grow muscle, create a good flow of milk, make red blood and red flesh, nerve, brain, etc., they have to feed foods rich in protein, and that carbo-hydrates produce heat and energy, but few farmers can tell just what they ought to apply to their soil to get the best results. We have found that on the heavy clay soils around Loveland a little carbonate of lime gives us excellent results. Two years ago one of our ditches took the factory sewerage and used it for fall irrigation. The ditch was flat and had a heavy growth of moss, and as a result the lime settled in the ditch and it cost a lot to clean it out in the spring, and farmers said that settled the question of irrigating with sewerage. However, when the crop was harvested, they found they could well afford to levy an assessment of $1.00 per acre to clean the ditch in order to use the sewerage, and that is what they have done for the last two years. This sewerage is rich in potash and other valuable fertilizing elements as well as lime, and the winter irrigation itself has a very beneficial effect on the land to be cropped. An intelligent farmer learns to diagnose his crops' needs from their appearance: for instance, if he sees a piece of alfalfa with a sickly, yellow appearance, he can set it down

that a little carbonate of lime will help it, just as nitrates and humus help beets that get the same appearance where the soil is impoverished.

I observed that the early planted beets, getting their last irrigation in August, seemed to weigh heavier and consequently yield better than beets of the same apparent size watered about the middle of September, and on looking for the cause I found that it was because they were richer in sugar. In other words, the richest and best yielding beets came from the land where they were the hardest to plow out. I wonder if others had the same experience—won't you tell us in "Through the Leaves" whether, in your opinion, late watering pays?

I have wondered, year by year, what is the best way to stop the practice of burning straw stacks in the field, when it could add so much to the fertility of the soil if used as a fertilizer, and I have noticed that the burning is mostly done on rented farms. Would it not be a good plan for the owner of the farm to encourage the renters to feed a couple or three carloads of stock each winter, confining the stock in a yard, utilizing the beet tops as they do in parts of Weld county, where they silo them with straw, putting down a layer of straw about a foot thick, then a layer of tops, another layer of straw, and so on? This makes the straw very palatable, and the mixture makes a fine feed. The rest of the straw can be used for bedding, and in the spring all of the straw will be converted into a fine fertilizer. The land owner could afford to give the tenant all the roughness, as he would get his returns in the increased productiveness of the land.

I wonder how many of the farmers who read "Through the Leaves" raked their grain fields this fall after the grain was taken off? Most people think it is not worth while, but we tried it on a 35-acre wheat field. Our scatterings were not greater than the average, but we thought it would pay and we raked and stacked them at an expense of $10.50. When we threshed the rakings we got 57 bushels of marketable wheat, which sold at $1.71 per cwt. and brought us $58.48. I think we will continue to rake in the future.

We farmers up here are not fighting so hard to get the

Sugar Co. to pay more money for beets, as we are to get more beets per acre for the Sugar Co., to pay for, and we seem to be succeeding about as well along this line as the other fellows do along the other, as we got an average yield of 14.86 tons per acre on our measured acres, which brought us an average price of $5.82 and we are not denying that the crop was profitable.

We had a good deal of politics the past season, and considerable experience with politicians. Once in a while you will find one who is honest, but numbers of them will stoop to falsehood and misrepresentation to gain their own ends. The farmer will get to do his own thinking by and by and when he does he will see that his vote is not cast against his own interests, and he will be surprised to find that the interests of farmers and corporations can be mutual.

Colorado Leads United States in Production of Sugar Beets

Colorado's supremacy as a beet sugar state is shown by the following comparisons made in the November bulletin of the department of agriculture:

	Acres Harvested	Tons of Beets	Value	Sugar Yld. Tons
California	107,000	906,000	$ 5,797,000	146,000
Colorado	**132,000**	**1,552,000**	**8,642,000**	**191,000**
Idaho	25,000	260,000	1,299,000	35,000
Michigan	100,000	915,000	4,785,000	114,000
Ohio	17,000	182,000	919,000	21,000
Utah	42,000	571,000	2,818,000	74,000
Other States	63,000	671,000	3,600,000	83,000
Totals	486,000	5,147,000	$27,050,000	664,000

In other words, Colorado has 27.1 per cent of the total acreage in the United States; produces 30.1 per cent of the total tonnage of beets; receives 30.9 per cent of the money paid for beets, and yields 28.7 per cent of all the beet sugar produced in the country.

Moving Day

From "Breeders' Gazette"

In many states custom has made March 1st moving day. The renter goes to another place, too often a run-down farm. Here he is to put out another crop and prepare for another move. Thus continues a rotation of renters, thus is kept alive a custom that is the curse of American agriculture. What this short term lease system costs the individual renter in money returns and what it costs the landlord in depleted soil facilities nobody knows.

The disadvantages of a one year lease are so obvious that it is useless to attempt to enumerate them. However, with livestock as a basis of successful farming, special attention may be called to the handicap that both renter and landowner suffer. If the renter lacks the assurance that he will not be forced to sacrifice his stock at public sale in the mid-winter months he very naturally declines to get much live stock about him, however profitable it might be under different conditions. So he sticks close to grain farming, selling off his crop and the fertility of the farm at the end of the season. Then leaving the farm poorer for the next man, he goes to another farm that somebody has left poorer for him. A plan is needed that will make it profitable for the renter to own livestock and to build up the soil by feeding on the farm the crops that are grown there. With a long time lease system, and the assurance that the renter will share in the increased profits, we shall have taken a long step forward. Sometimes the renter is naturally a poor farmer, as has been charged. More often he is the victim of the rental system that is wrong.

The first beet sugar factory in the United States was erected at Philadelphia in 1830. It did not prove a success and was dismantled. The first successful beet sugar factory was built in 1870 at Alvarado, Cal. This factory was in operation until 1913, when it closed down.

Siloing Beets at Scottsbluff

Edmund Simmons, Manager Scottsbluff Sugar Co.

A unique feature of the beet sugar industry of the North Platte Valley and one which has contributed materially to its success, lies in the fact that the growers for the Scottsbluff factory enter into contracts wherein they agree to silo twenty-five per cent of their respective beet crops—and actually do silo more than that amount.

In the season just closing, the acreage contracted was larger than ever before. The tonnage per acre was heavier than in previous seasons, and the total crop reached the rather splendid total of 252,671 tons. Of this amount 76,092 tons, or 31.11% of the crop was siloed and delivered later according to the factory's needs.

These growers believed in the beginning, when the factory was constructed in 1910, that the siloing and holding back of a portion of their respective crops would be of advantage to the factory, but many were skeptical as to the growers realizing equal benefits from same. As a body, they have been fairminded men, and have exhibited a disposition to fulfill their agreements. This fairness and integrity has evidently led them into the realization that the silo feature as planned by the Scottsbluff factory is also of material advantage to themselves, as is plainly evidenced by the increased percentage of the crop siloed in successive years. A study of the following table will show the increasing popularity of the silo feature from year to year:

Year	Total Tons	Tons Siloed	% Siloed
1911	118,700	13,661	11.50
1912	171,703	50,588	29.55
1913	216,353	66,915	30.93
1914	252,671	76,092	31.11

My experience of recent years has convinced me that the clause providing that one-fourth of the crop shall be siloed, which has been opposed, in other beet growing sections, by so many who have not given it a thorough

trial, is a benefit to both factory and farmer. Universal adherence to the provision of this clause by both factory and farmer is a near approach to an ideal form of co-operation between the two. The important results realized in this territory from such co-operation have been, a safer handling of a large crop; a larger acreage of beets because of the increased safety; a longer time in which the grower may deliver his crop with his own equipment, and hence a reduced expense to the grower for handling; a longer campaign; and following this general expansion and increased security, a larger amount of money to be distributed throughout the community.

For those who are not familiar with the Scottsbluff territory, I will say that throughout this territory the soils are universally of a sandy or light texture. This condition lends itself nicely to the practice of siloing, as the looseness of soil, no matter how dry, renders the covering and uncovering of the siloes less laborious.

In the beginning, a considerable number of growers siloed beets by having the toppers throw the beets into extra large piles as topped, covering these piles with earth. This plan has since been abandoned and now all growers have adopted the form recommended by the factory of siloing in long ricks about 16 feet wide at the base, 6½ or 7 feet high, and 2 feet or more wide on top, the length of the rick depending upon the quantity of beets put in. Where a considerable acreage is being siloed, and a number of teams hauling to one silo, it has been extended in opposite directions. Where only two teams were hauling, however, it has been the practice to immediately cover one end with earth. In all cases, the sides of the silo are covered with earth as fast as the silo takes permanent form to prevent unnecessary shrinkage in warm weather, or to prevent freezing if the nights are cold. Until completed the open end of the silo is covered at night with tarpaulin made of old filter cloths, beet sacks, etc In no cases are the tops of the siloes covered with earth, as these must be left open for the escape of heat and moisture. A few cuts are furnished herewith for the purpose of illustrating

the type of silo which has proven universally a success in this Valley.

In such seasons as the fall just past, where beets are delivered exceptionally clean and free from dirt or other trash, these siloes may be made 20 feet wide at the base, 7 feet high and about 5 feet wide on top. If a silo is made larger, as in the latter case, it is obvious that less dirt per ton of beets must be moved to cover the sides of same. Our best siloes this year, best for both farmer and factory, were those that were 18 to 20 feet wide at the base. My experience indicates that there is no limit to the size a silo may be made to keep beets satisfactorily, providing the beets are put in clean and sound---unless put in too early. This last qualification briugs up the question:

"What is the proper time for beginning to silo beets?"

This depends upon the condition of the crop and the maximum daily temperatures following the construction of the silo. Beets can be put into silo too early. We built an experimental silo of eighty tons on September 25th, but sustained excessive shrinkage through overheating, and some loss through decay. These beets were immature, and the weather during the first ten days they were in the silo was exceptionally warm, in fact, the average maximum temperature at this time was 12 degrees above the average maximum temperature for the same dates for the three years preceding. Our observations covering our own experimental siloes, and many early siloes of our growers, show that there is a hazard of unnecessary shrinkage or deterioration in siloes constructed before October 7th in the season just past. The decision as to when to begin siloing must be reached through consideration of the maturity of the beets to be siloed, the percentage of dirt adhering to the same, the daily temperature at the time and the probable temperature of the week or ten days to come. In all this, considerable experience is of course a valuable factor, but the few inconsequential losses sustained by our growers in past seasons go to prove that they possess the experience and

350-Ton Silo Near the Scottsbluff Factory

End View of Silo About 20 feet wide at the Base

Showing End and Side of 20-foot Wide Silo Containing Over 100 Tons

judgment necessary to assure them a satisfactory practical success.

The Sugar company and its growers in this Valley have no misgivings and no doubts as to what will happen to frozen beets put in siloes. We all know. Likewise our growers understand why the Sugar company refuses to put frozen beets into its storage piles at its various receiving stations.

It has been the policy of this company to grant a liberal period of time for the delivery of siloed beets, giving all growers equal opportunity in proportion to their respective tonnages, but extending special accommodations where conditions warranted and it could be done without detracting from the rights and privileges of others. In harmony with this policy the delivery of siloed beets was begun at all stations on November 16th. Fully 90% of our growers completed delivery of the siloed portion of their crops by December 20th, but the remaining growers, with long hauls, or with more than the usual percentage siloed, required a longer time unless extra teams were employed. So far as I know, not a single grower was compelled to hire an additional team to deliver his siloed beets. From this it will be observed that the average grower keeps his own money in his own bank account by utilizing only his own equipment for the delivery of his crop. The last load of siloed beets was delivered to us January 9th. In the meantime we were shipping piled beets from our stations, for while we had 76,092 tons siloed, we also had more than 63,000 tons piled at our dumps.

The harvest of our crop was begun September 25th, a week later than the year before, but enormous as the crop proved to be, the harvest was completed on November 2nd. In other words, the harvest and delivery of 76,000 tons into silo on the farms was completed in much less time than would have been required for the harvest and delivery of the same into storage piles at the dumps, with the additional advantage that when these beets were delivered at a later date they were taken over the dumps without unloading by hand and without delays to the

grower, as deliveries were so regulated that delays did not occur.

Where the additional compensation is sufficient to cover the shrinkage and additional labor involved in siloing beets, it is obvious that the co-operation of the growers in the general adoption of such a plan is productive of much additional substantial benefit to the community concerned. The thorough working out of this plan, and the actual siloing of more than the amount agreed upon by the growers, has resulted in no regrets on the part of either farmer or factory. On the other hand, the advantages realized by both farmer and factory have been such that for the coming year the beet crop will be handled under the same plan with full expectations of similarly pleasing results.

How to Grow a Crop of Sugar Beets

[Last year our Denver office caused the Agriculturists of the several factories to write an article on how to grow a crop of beets. A copy of each was sent to each Agriculturist for comment. I am going to publish these observations, the one appearing below is by Agriculturist John Comer of the Windsor factory.]

Fertilizing.

On 55 acres grown in 1913 at Windsor the cost of fertilization amounted to a little over $6.00 per acre, this cost covering labor charge alone, no charge having been made for the fertilizer. About fourteen 80-bushel spreader loads are used per acre. In all cases where the haul is over ½ mile, manure is hauled in wagons to fields in the winter time and piled in ricks three or four feet high. This is applied to fields in the spring with the use of spreaders; Nisco spreaders are used, two horses being used on each. Two spreaders are usually in use at one time, utilizing one driver and two extra men at pile for loading. The one driver can thus keep busy most of the time driving one spreader while the other is being loaded. The sooner the fertilizer is plowed under after spreading, the greater the value obtained from same. Two or three

plows are usually required to keep up with the fértilizer. Fertilizer should be applied each year where beets are grown, say from ten to fourteen 80-bushel loads per acre. No fertilizer is applied for alternating crops other than beets. No alfalfa is grown when plenty of fertilizer is available. If there is fertilizer available and if fall plowing is done, the fertilizer is hauled after the beet crop is laid by, being piled around the sides of grain fields and after grain is harvested and thrashed the ground is double-disced, fertilized and fall plowed.

Plowing.

If fall plowing is done, from 1½ inches to 2 inches of new soil can be turned up. On the other hand, if plowing is not done until spring, ground should only be plowed to depth of old soil. After fall plowing, ground is usually allowed to lie during the winter without other preparation. Two way plows are employed, two of these usually being used on each furrow. This allows a short rest for each team at alternating ends of rows. Three or four horses are usually used for each plow. In the spring the ground should be harrowed twice, the usual practice being to ride the harrow over once with teeth straight up. Either a three-section harrow with a three-section evener and three horses, or two sections of a three-section harrow with two-section evener and one team, are usually used. If ground is cloddy or heavy the harrowing is usually followed by a planker. After this the field is usually floated and harrowed a third time. Both the floating and the last harrowing should be at right angles to direction of planted rows. The above observations apply to ground that is not sandy and liable to blow.

On sandy soil it is advisable to plow a little wet if possible, let lay a day, roll with a Western Land Roller, follow with harrow with teeth straight up; then float light and harrow again with teeth straight up. If excessively sandy, care should be taken to do an even job of plowing, so that floating will not be necessary.

Breaking Alfalfa Ground.

Crown the plants in the fall by plowing as shallow as possible. Follow this with a spring-tooth harrow, which has the effect of bringing the roots and crowns to the sur-

face of the soil. If spring-tooth harrow is not available, use a beet cultivator with eleven tongues set zig-zag. Crowns should be allowed to lie in this condition through the winter and should be again harrowed in the spring, using either a spring-tooth harrow or cultivator, as mentioned before. Land should be allowed to lie as long as practicable in this condition and then plowed about eight inches deep. Harrow and allow it to remain and dust off the top. On account of the large amount of roots in this kind of soil it is advisable to roll in order to pack it. Harrow again, riding the harrow, float, and harrow lightly, again just before planting.

Planting.

Plant seed about 1 inch deep and at no time over 1½ inches deep. If planting is done late it will be necessary, owing to dryness of soil, to plant a little deeper than if done early. Planting is usually done with John Deere or Gale drills. Rows are sown 20 inches apart. If land is very flat it is sometimes advisable to use 24 inch and 18 inch alternating rows. If necessary to replant, either float and harrow, or harrow, float crosswise, and harrow again. If wild oats are present, plow shallow, then harrow, float and harrow.

Crusting of Ground.

In case of crust forming on ground after beets are planted, liable to prevent them from coming up, crust should be broken by use of Planet Jr. crust breakers. On sandy soil duck-feet should be used, together with the crust breakers, between the rows, stirring the soil and preventing blowing.

Cultivating.

In case of a good thick stand, beets should be rolled, and if press wheel depression is not too deep, harrow cross-wise of the row then cultivate. If stand is not thick, use a duck-foot between rows and a crust breaker over the rows, following this with a second cultivation before thinning, at which time knife attachments are used. On ground that has been previously cropped to alfalfa, cultivator should be used with discs, with bull-tongue or small duck-feet between rows to level ridges made by discs.

Blocking and Thinning.

Ordinarily a 7 inch or 8 inch hoe is used for blocking the average stand of beets. Final stand should not be over 12 inches or an average of about 10 inches apart. For later hoeings a somewhat narrower hoe should be used, say 5 inch, because the beet having grown the wider hoe used in blocking is likely to injure the plants. Care should be taken to avoid tearing out small plants in thinning, by dragging the feet over them, and wherever possible laborers should be required to leave the remaining plant in good condition, that is, by having sufficient dirt to place around the base of the leaves to keep the plant in an upright position.

After blocking and thinning, beets should not be allowed to stand more than a day before being cultivated again, the duck-foot attachment being used. Every week or ten days until first irrigation, soil should be cultivated either with knives or duck feet. Care should also be taken to cultivate as soon as possible after rain in order to retain the moisture in the soil.

Irrigating.

In ditching ground for irrigation care should be taken to avoid throwing dirt on crown of beet. After the first irrigation, if ground is shaded by foliage, it is unnecessary to do further cultivating. If leaves are small and do not entirely cover space between rows, the field should be cultivated either with knives or duck-feet, followed with the ditcher. If land is flat, water should be used in every alternating row at first irrigation, otherwise in each row. Beets are usually irrigated from three to five times during the season.

Harvesting.

No more beets should be plowed up during the day than can be pulled and topped during the same day. If the beets which are plowed, pulled and topped cannot all be hauled, they should be covered every night to prevent freezing. When plowed out, the plow should run only deep enough to break the tap root without breaking the beets. It is usually advisable to leave as much of the root as possible in the ground until beets are pulled by hand.

Also properly adjust the plow so that they will be left in an upright position.

Beets are usually topped squarely at the base of the bottom leaf. In case of large tapering crown, however, the topping can be accomplished by trimming the leaves off and by rounding off the tops. Hooks should be used on knives for picking up beets and these hooks should only be used on the crown of the beet.

Livestock Market Letter

Ben Kemper, Pres. Denver Livestock Com. Co.

The receipts of cattle here this month have not been very liberal but ample for the demand. Prices here are very high as compared with the River on all classes of cattle.

Good beef steers selling from $7.50 to $7.75, with the top around $8.00. Good cows selling from $6.25 to $6.65, with the top around $6.85. There has been a few cows selling higher than this.

The receipts of cattle at the eastern markets in the past three weeks has been very heavy. Cattlemen are somewhat discouraged as corn has been advancing consistently for the last sixty days. In many cases, the feeders are paying sixty-five and seventy cents for their corn. Prices of hogs are much below the average and the consequence is, that the feeders in Kansas, Nebraska, Iowa and Illinois have been liquidating their cattle and it looks like they are just as anxious to get rid of them as they were to get in last fall.

I do not think these conditions will last very long and if they keep shipping their cattle in the way they have in the last thirty days, they will liquidate the most of these cattle, and with anything like a decent demand, we are sure to have higher prices.

Argentine has had some beef here in the last two weeks, but not as much as last year. Good young cows and good yearling steers are in very strong demand.

Siloing Beet Tops or Pasturing Them

E. C. Bolte

The siloing of beet tops is a comparatively new operation to the beet grower of this section, and it might be of some interest to learn the data gained by German scientists who have carefully studied this problem years ago, assisting the farmers of that country in the valuation of such feed.

The siloing of beet tops is by no means the most economical way of preserving the food value contained in the beet tops, but it is decidedly more so than to turn out a bunch of stock on a harvested beet field and let them help themselves. The loss of food value that occurs in the process of souring or fermenting in the silo pit is quite astonishingly large, but the loss that occurs in pasturing the tops is still greater. To prove this, I would like to call attention to the following facts:

The beet top silage when well cured, comes out of the silo at about flood temperature; the crowns are juicy, yellow pieces of cooked vegetable, and all the leaves are still adhering, from the oldest to the youngest leaf---a nice dark green mouthful of feed, from which comes an odor not at all offensive to the animals.

This succulent, palatable feed is available in mid-winter, with snow and ice over the field from which they were harvested a few months previous, as a by-product of a main crop, which in itself was a profitable one.

In a previous issue of this paper, Mr. G. E. Holmes of Merino, estimated that one steer of 1000 lbs. live weight at the beginning of the fattening period, could be successfully finished from the silage yielded from one acre of beets of about 12 tons of roots, using the silage as the main feed. The daily feed would be about 50 lbs. of silage, 12 to 15 lbs. of alfalfa hay and 2 or 3 lbs. of molasses. This gives a well balanced ration, as the silage contains about 23% dry substance, 1.5% digestible proteins and 10.5% digestible carbo-hydrates in a ratio of 1:7 approxi-

mately, according to German analysis of silage. However, dry substance determinations carried out recently, show that the silage put up in open trenches in the ground (without concrete sides and bottom) has a test of about 28% after about 45 days curing. While curing a liquid or juice developed and stood out well on the sides, but soon disappeared again, either draining out into the ground or back into the silage; this loss is, of course, very important, and it would soon pay to concrete the side walls and bottom of a silo.

The feeding value of one pound of corn is equal to 8 pounds of silage, and on this basis one ton of silage would be worth $2.50, assuming corn at the low figure of $1.00 a hundred. What the actual cost of silage is, cannot be said at this date, but would venture to say it should not exceed the above estimated value.

All animals relish this food and it is taken without bad effects on their digestive organs, when gradually brought to full feed. For dairy cows this silage has a very stimulating effect on the milk production, but it has to be fed with care as the acid feed can cause abortion. It should not be fed in the last two or three months of pregnancy. A large quantity of water is taken by the animal when fed this silage.

The silage will keep very well into summer, but as a rule should be well fed out by spring.

Now let us compare the value gained by the "easiest" way of feeding beet tops by pasturing. After the beets have been harvested and the silos fenced in, and access made to water and a stack of hay, the stock is turned loose. The stockmen figure that 2 acres of beet tops will feed a steer for 60 days and he will gain about 100 lbs., on the average of a number of years, if the weather is favorable. But this last "if" is the important question; what becomes of the beet tops when winter sets in early, with snow a foot deep and zero weather? The stock will paw out a pile of tops here and there, to find it frozen harder than flint; the leaves are dried and break off, the crown is so hard both from drying out and freezing, that if it does not get stalled on the way to the pouch (frequently a cause of death of animals pastured in beet tops) the

critter has a stomach full of frozen feed which it has to throw out at the expense of its body heat. It will only eat enough tops to satisfy its hunger and mostly take hay to barely stand the weather and be able to have enough surplus heat to thaw out another meal of beet tops which it likes so well.

Up to the time of severe weather the stock will practically only eat beet tops. Many a calf and horse has been lost, for the beet tops contain quite a lot of oxalic acid which is a strong stomach poison, and which is reduced to at least half strength by the siloing process. Two or three weeks after harvesting the beets, the leaves have dried so much that when they are picked up by the animal and gotten into the mouth, at least two-thirds of the foliage has been lost, and in many cases the size of the crown governs the price paid for the acre of tops for pasturing.

If milder weather follows a precipitation, the fields soon get muddy, and while eating, the stock buries more feed in the mud by tramping, than it eats, and when once covered with mud, will never be taken, and this is the greatest source of loss.

The question of manure is also in favor of the yard feeding, as here it lies concentrated in a protected place, and can be applied to the land in such quantities as required for maximum yields. The quantity and quality of manure is much greater; as wasted hay, but especially if a straw stack is right in the feed lot, increase both quantity and quality. The urine is absorbed, and the least loss of fertilizing value occurs. On the contrary, the few droppings on the open field soon dry out, and before they do any good to even the few square inches on which they lie, they are blown away as dust or the quantity of fertilizer applied to the surface, one animal on two acres, is so small that it cannot be noticed.

But here is a decided disadvantage to pasturing stock on a softened field, and this cannot always be avoided. The domestic animals all have a habit of making trails and following these, especially to the watering place or haystack, etc., and when the beet field is plowed in the spring, you can see these now cloddy trails, even when the

field is ready to be planted, and the result is that a very poor germination of any kind of seed on these places, is obtained, and in some cases you can see these trails, like old roads, even at harvest time.

Summing up the advantages of feeding siloed beet tops as against pasturing them, I would venture to say that the extra cost of siloing is well paid back, provided you want to work seven days in the week in winter as well as summer.

The Balanced Ration in Feeding

A. B. Cross

I believe that some feeders do not take into consideration the analysis of the various feeds as to protein and carbo hydrates, in feeding their stock for fattening purposes. The proper ration is 1:5 or 1:6—that is, one part digestible protein to five or six parts of digestible carbo hydrates.

Another matter to take into consideration is the amount of dry substance an animal should eat. A steer of 1000 pounds weight will usually consume in 24 hours from 26 to 30 pounds of dry substance, containing digestible protein of 3.21 pounds and digestible carbo hydrates of 16.5 pounds, which makes a ration of 1:5.12. This may be increased in carbo hydrates during the end of the feeding periods. Bear in mind that a cow will consume more feed than a steer and a ewe will eat more than a wether. Comparing a wether to a steer in feed consumption, one steer will eat about as much as seven wethers. The feeder must not follow any set ration, however in feeding. He must be governed by his eye as to how an animal is doing and increase or decrease feeds according to his judgment. The analysis of various feeds based on digestibility follow:

	% Dry Substance	% Protein	% carb. Hydrate
Alfalfa	92	11	42
Molasses	78		55
Cotton Seed Cake	92	37	44
Corn	90	8	76
Oats	90	9	57
Rye	90	10.5	68
Oat Straw	90	1.4	40
Wheat Straw	90	.4	36
Cane	80	2.4	53
Corn Fodder	58	2.5	37
Dry Pulp	88	7.5	75
Barley Straw	90	.7	38

From the above the proper ration can be worked out to begin with, but as I stated before you must change your feeds as conditions warrant, based on the progress the animal is making. The protein and carbo hydrates in pulp vary according to the dry substance in the pulp---for instance, 100 pounds of pulp:

% Moisture	% Dry Substance	% Protein	% carb. Hydrates
93	7	.5334	5.852
92	8	.6096	6.688
89	10.5	.8001	8.778
88	12	.9144	10.032

In feeding our own cattle at Sterling, Brush, Fort Morgan, Colorado, and Scottsbluff, Nebraska, where we feed from 1600 to 2500 head of steers at each point, we furnish the Superintendents in charge of the feeding operations with memorandum of balanced ration to be fed during the various periods of the feeding operation. These are furnished simply as a basis and are changed as the Superintendents feel the condition of the animal justifies. The ration as recommended for steers, based on 1000 lbs. live weight, follow:

TABLE NO. 1

Average Ration to be fed Oct. 15th to Jan. 1st.

Feed	Lbs. per head per day	Lbs. Dry substance	Lbs. Protein	Lbs. Carb. Hyds.	Ratio
Pulp	125	13.1	1.0	11.0	
Hay	15	13.8	1.65	6.3	
Cot'nseed	1.7	1.6	.60	.75	
Molasses	2	1.6		1.10	
		30.1	3.25	19.15	1:5.9

TABLE NO. 2

Average Ration to be fed Jan. 1st

Feed	Lbs. per head per day	Lbs. Dry substance	Lbs. Protein	Lbs. Carb. Hyds.	Ratio
Pulp	100	10.5	.80	8.8	
Hay	15	13.8	1.65	6.3	
Cot'nseed	2	1.8	.70	.90	
Molasses	4	3.2		2.20	
		29.3	3.15	18.20	1:5.78

TABLE NO. 3

Average Ration to be fed After Cold Weather

Feed	Lbs. per head per day	Lbs. Dry substance	Lbs. Protein	Lbs. Carb. Hyds.	Ratio
Pulp	80	8.4	.64	7.04	
Hay	15	13.8	1.65	6.30	
Cot'nseed	2.5	2.3	.92	1.10	
Molasses	4	3.2		2.20	
		27.7	3.21	16.64	1:5.12

TABLE NO. 4

Average Ration Finishing Period

Feed	Lbs. per head per day	Lbs. Dry Substance	Lbs. Protein	Lbs. Carb. Hyds.	Ratio
Pulp	60	6.36	.48	5.28	
Hay	15	13.8	1.65	6.30	
Cot-nseed	3	2.8	1.11	1.32	
Molasses .	2	1.6		1.10	
Corn	6	5.4	.48	4.56	
		29.96	3.72	18.56	1:5

Table No. 4 is used only in case the feeder wants to finish with corn. We did not feed any corn last year and it is our intention to feed none this year.

The Yield of Beet Tops

Asa C. Maxson

The increasing interest in beet tops as a feed for stock on the farm is manifesting itself in the number of inquiries regarding the yield and value of this by-product of beet growing

The yield of beet tops is subject to the same fluctuations as all cther farm products and is subject to variation under the same conditions to a very great degree, i. e. weather conditions, fertility of the soil, insect attack and disease, time of harvesting, amount of crown left on the tops and method of handling.

Since 1910, weekly samples have been taken from the experimental plots at the Longmont factory and the per cent of tops as figured on topped beets determined. The results of these samples show that in 1910 the per cent tops was 53.6; in 1911, 57.5; in 1912, 83.0; in 1913, 68.2; in 1914, 69.0, on Sept. 17th. The average for the 5-year period is 66.26%. This means that a crop of 15 tons per acre would yield 9.94 tons of fresh tops.

When we arrange the 5 years from 1910 to 1914 ac-

cording to the amount of rain fall during September and October, we find that with one exception there is a direct correlation between this rain fall and the yield of tops, the heavier the precipitation during these months the heavier the yield in per cent. The year 1913 is the exception and this can be largely explained by the fact that the sample patch was very badly affected by leaf spot which destroyed the tops prematurely.

The following table shows the effect of fall rains on the yield of tops:

Year	Rain in Sept. and Oct.	% Tops
1911	1.50 inches	53.6
1910	1.51 inches	57.5
1914	2.82 inches	69.0
1913	3.77 inches	68.2
1912	3.97 inches	83.0

The following from the records of the 1914 samples show the effect of soil fertility on the yield of tops: Sample No. 1 was taken from a plot which had grown beets for several years, having been manured once (1913) since 1910. Sample No. 2 was from a part of the field which grew alfalfa in 1912, which was sown without a nurse crop after the field had been manured. The field was summer fallowed in 1913 so that it was in the best of condition to produce a heavy yield of beets, the average of the 4 acres being nearly 23 tons per acre. On Sept. 14, Sample No. 1 gave 69 per cent tops and Sample No. 2, 106.1 per cent. This difference in the per cent tops was not accompanied by a corresponding difference in yield of beets. As already stated the yield of beets in field No. 2 was nearly 23 tons or to be more correct 22.8 tons while that of field No. 1 was 22.7 tons.

The fact that insect attack or disease affect the yield of tops is too obvious to need comment.

That the time of harvesing has a marked effect on the per cent yield of tops is a well known fact and is shown very plainly by the samples taken. Taking the average for the five years during which the sampling has been done we have the following:

1st week 169%	7th week 66%
2nd week 137%	8th week 66%
3rd week 129%	9th week 65%
4th week 117%	10th week 48%
5th week 90%	
6th week 74%	

The first week is the week of July 22 and the last the week of Sept 20th. Of course all of this loss in per cent is not loss in total yield as the beets are growing in size faster than the tops during the latter part of the season.

So far we have been speaking in terms of per cent on topped beets since this furnishes a basis for estimating the yield. This is misleading in that it makes it appear that the yield of tops diminishes toward the end of the season which is not always the case unless disease or insects destroy the leaves, as the following will show:

Year	Lbs tops per acre July 22	Lbs. tops per acre Sept. 17
1911	20,399	16.244
1913	25,352	21,233
1914	27,904	39,180
1912	31,098	31,478

It will be noticed that the yield of tops in 1911 and 1913 is lower on the last date than on the first, while in 1912 and 1914 the opposite is the case. A possible explanation is that the year 1911 had a relatively low fall precipitation while the leaf spot killed the leaves prematurely, as already stated, in 1913. The average of the four years shows that the yield of tops just about holds its own after July. These averages are: for July, 26,188, and for Sept. 27.044 pounds of tops per acre.

It is very obvious that the greater amount of crown cut from the beet in removing the tops the greater will be the yield of tops and values also, since the greater part of the feed is in the crown. Beets growing well out of the ground and beets with large crowns will yield heavier in tops than those growing in the ground and with small crowns.

As to the method of handling; there is no more wasteful method than pasturing on the field and it is doubtful if the cost of hauling is greater than this waste. The pil-

ing of tops in the field and feeding them in a feed lot while more expensive than pasturing has given such good results that many feeders are adopting this way of handling them. This method has the further advantage of preventing the trampling of the field which is injurious, especially during wet falls.

The siloing of beet tops is beginning to come into practice more and more every year. It is safe to figure that there will be a shrink in weight, due to loss of moisture, of about 40% in the silo, however, this does not mean a loss in feeding value. There is no doubt a slight loss in feeding value in siloing beet tops just as there is in siloing corn ensilage, but on the other hand the fresh condition of the tops overcomes this to a great extent. The cost of siloing beet tops in a pit silo is about 1-3 of that of siloing corn ensilage per ton including the digging of the pit.

The comparative value of siloed beet tops and the tops handled in other ways has not been demonstrated. As compared with corn chop it is probably safe to say that each 8 pounds of siloed beet tops is equal to one pound of the chop. Putting it in another way we can safely say that in each ton of fresh tops there are 130 pounds of digestible nutrients, that a 15-ton crop of beets will produce 1292 pounds of digestible matter per acre. As compared with alfalfa hay this is equal to about 1 1-3 tons.

GET THE MAN HIGHER UP

A young lawyer had been appointed to defend a negro who was too poor to employ counsel for himself. Eager for an acquittal, the young attorney challenged several jurors, who, he said, might have a prejudice against his client.

"Are there any others?" he whispered to the negro.

"No, boss," said the defendant, "but Ah wants yo' ter challenge dat judge. Ah's been convicted undah him several times now and Ah think he's got er prejudice erginst me."

Guessing Future Prices

H. Mendelson

Before the war it was generally believed that the wheat crop of the United States would have to be marketed at a rather low figure as it promised to be the largest on record, while the world's production seemed to be rather normal.

Since the declaration of war wheat has gone up by irregular amounts and is now quoted (Jan. 19) at Chicago, at $1.38-$1.41 for No. 2 Red. Quotations for the same grade were:

Nov. 2, '14	$1.13-$1.14
Oct. '14	$1.02-$1.16
Sept. '14	$1.01-$1.18
Oct. '13	$0.87-$0.97
Oct. '12	$1.03-$1.13
Maximum '11 Jan	$1.01
Minimum '11 April	$0.83
Maximum '10 Febr.	$1.27
Minimum '10 Nov.	$0.89
Maximum '09 June	$1.60
Minimum '09 Aug.	$0.99

The following are the five highest and five lowest quotations since 1864:

Highest		Lowest	
Aug. '67	$2.85	Jan. '95	$0.49
June '64	$2.26	Sept. '94	$0.50
July, '68	$2.20	June '96	$0.54
Nov. '66	$2.03	July '93	$0.55
*Sept. '88	$2.00	Jan. '00	$0.62

*This was during the "Hutchinson Corner." The next day the price was $1.04-$1.05.

These are quotations. What the farmer actually gets is a different matter. Extraordinary top prices are possible only when there are very few sellers, just as extraordinarily low prices are possible only when there are very few buyers.

Farmers Bulletin 641 of the Department of Agriculture,

issued Nov. 23, '14, gives prices paid to producers of the different states Nov. 1, '14. While the Chicago quotation Nov. 2, was $1.13-$1.14, the average price paid for wheat to producers for the United States was 96.2c, and for Colorado 81c, for Illinois 101c. (Page 33 of the bulletin). Aug. 1, '14, No. 2 wheat was quoted at Chicago at 87-88c, while the same date the average price paid to producers in the United States was 76.5c, and the average for five years 91.1c. For Colorado it was 76c and the five year average 94c; for Illinois 77c and 90c respectively. Therefore it seems that a considerable amount has to be deducted from the very attractive top quotations to derive what the farmer actually gets. It is significant that the high prices quoted after the civil war were never reached again except by so-called corners: the Hutchinson corner, September '88 with $2.00, and the Leiter corner, May, '98 with $1.85. The next highest quotation was reached in June, '09 with $1.60.

The population of the United States in 1870 was 38.6 millions, the wheat production 236 million bushels or about 6.1 bushels per head. The population now is about 100 millions, the production of wheat in '14 was about 892 million bushels or about 8.9 bushels per head. Therefore the domestic market alone does not warrant any extraordinary rise in price.

A similar calculation of the world's visible supply and population shows that there is more wheat per capita than there was fifty years ago. .

Prices are undoubtedly influenced as much by prevailing opinion of future demand and supply as by the actual conditions of the present.

It is evident that the war has not increased the number of consumers. Indeed the numbers seem to be decreasing every day. The war has not increased the purchasing power of the consumers. Germany, in peace times a buyer of wheat, is now practically excluded from the world's market.

It is possible that the men in the armies eat more wheat than during peace times, as bread furnishes a large percentage of the army's food. But on the other hand the families remaining at home must use cheaper substitutes

when flour prices go up. Besides the German and Russian armies live mostly on rye.

The main factor in the increase in prices seems to be that a large number of owners of wheat are holding back for higher prices. While the year's world production is a little less than last year's, it is not so very much behind other years.

World's production in **billion** bushels:

'14	3.4 (estimated)	'09	3.6
'13	3.8	'08	3.2
'12	3.4	'07	3.1
'11	3.1	'06	3.4
'10	3.6	'05	3.3

As to future production it is evident that high prices inevitably lead to an increased production. There is no doubt that the area planted in the United States and Canada is going to be largely increased. In England many pastures are going to be broken up. In Germany, Russia, France and Austria a good many acres usually planted with sugar beets are to be planted to grain. The destruction of crops by war is in the opinion of experts of the Department of Agriculture largely exaggerated and is of no more significance in the world's market than a hailstorm and of not as much as a general drouth. Whatever the belligerents do on the battlefield, they certainly are going to do their utmost to raise the necessary bread. The army of women and children in Europe can furnish all the labor needed for the work.

The full influence of increased production can, of course, only be exerted on the price after the war. The duration of the war is something everybody or nobody knows anything about. The English seem to think it will be over next summer when they and the French have succeeded in pushing the Germans out of France and Belgium. The Germans, of course, do not agree with them on this point and certainly are preparing themselves for a much longer struggle. Conservative opinion is that nothing can be predicted with any degree of certainty.

Experienced feeders of livestock who must operate with widely fluctuating prices generally have come to the con-

clusion that certain profits can only be made by feeding the same number of animals for a series of years. The same holds good for any system of farming. The attempt to raise a maximum acreage of a crop only at maximum prices is rather dangerous. At any rate the soft spring wheat raised on our irrigated farms is not going to command the highest prices. The best hard spring wheat is probably "Marquis." It has stiff straw, is beardless, yields well, and does not shell as the common Bluestem and Fife does.

The future of sugar prices is similarly problematical. Germany and Austria furnish a large part of the world export trade. England gets her sugar mostly from these two countries. Nothing will be exported from them and very little from Russia. This means about 1,800,000 tons sugar withheld out of a total world's consumption of 18 million tons. The acreage planted to sugar beets in 1915 is undoubtedly going to be reduced in all countries. This would make for higher world's market prices. On the other hand consumption of sugar is going to be somewhat less on account of the general economic depression. As far as the inland prices are concerned free trade is going into effect May 1, 1916. If the present effective duty is $1 per 100 lbs, the prices are going to be lowered by approximately this amount, even before this date, just as was the case when the tariff was lowered 35c May 1, 1914. If in addition to this the war should end next summer and the large quantities of German and Austrian sugar are thrown on the world's market, a depression of prices will take place such as we have never seen before.

The ultimate effect of these varying factors on the sugar prices nobody can guess with any degree of certainty. The man who sells sugar beets today naturally will be inclined to guess a figure entirely different from the one who buys sugar beets today, but has to market the sugar from these beets 12 to 18 months from now. Just because these guesses differ is no indication that one man is a cutthroat and the other a fool. In a year or two we shall all be wiser.

THROUGH THE LEAVES

MARCH, 1915

Steer Fattened by J. H. Dickens. Weight 2300 Pounds

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Agricultural Notes

W. P. Hogarty

The growers have signed up with us today for about 10,000 acres of beets, but in no case have we been requested to secure them labor. We assume that you have made your arrangements direct with the labor, however, if you have not will you kindly inform us at once. Every day we have inquiries from families seeking labor contracts and we do not wish to send them away until your needs are supplied.

+ + + +

In the past two weeks we have had more than an inch of moisture. This will make your Spring conditions most favorable, and you should be able to get your soil in the best growing conditions.

+ + + +

The market conditions on fat cattle are not all that we would like, or expected at this time. It seems that the feeder always has the sack to hold, and there is always a plausible reason why the market is not better. We are indebted to Mr. C. F. Schalle for an article in this issue on the Foot and Mouth disease that has a bearing on the market condition. Mr. Schalle is feeding about 400 head of cattle at this factory for the late market. At the time of the breaking out of the disease in Illinois, Mr. Schalle was feeding heavily close to Chicago in the center of the infected zone, and is well informed on the subject.

+ + + +

The beet growers of the Scottsbluff factory have signed contracts for 32,000 acres of beets. This is 12,000 acres in excess of the acreage they can use at that factory, consequently the other 12,000 acres will have to be shipped to Colorado points. The total acreage signed up by The

Great Western Sugar company today is about 125,000 acres.

+ + + +

In the Fife district with an acreage of 649 acres tributary to that dump the growers averaged 18.32 tons of beets per acre, with an average sugar content of 16.3%. This means $5.80 per ton or $106.25 per acre for all the growers delivering beets to that station. We do not believe wheat, even at $2.32, can be very attractive to any one if they can secure such returns from their beet crops. In the Mead district with 658 acres they received an average of 16.1 tons per acre with $6.00 per ton as the average price. This gives them a return of $96.60 for every acre of beets delivered to the Mead dump.

There are several other dumps in our territory with almost as high an average as the ones given above.

The Boulder County Short Courses

The series of one-day short courses held in the various Farm Communities during the week of February 16 to 20, were well attended and greatly appreciated by both men and women. Despite the bad condition of some of the roads, all the meetings were pulled off according to schedule. However, it was thought best to call off the night program and add these illustrated talks to the day program, which made an unusually full day. Great interest was shown at all the meetings and the success was even greater than anticipated, after the recent snows put the roads in such bad condition. The great value of community gatherings of this kind can hardly be estimated and the smaller number of people present makes it possible for a closer acquaintance between the speakers and the farmers.

As one result of these courses the County Agent received requests for and mailed out 118 bulletins this week. These were on various subjects such as silos, small fruit growing, spraying, and the women seemed particularly eager for information on Domestic Water Supply, Curing of Meats, Canning, and the Use of Corn Meal. Of the 118 bulletins sent out, 98 were on the subjects relating to

the home or on subjects of interest to women.

This first series represents the beginning of a definite plan of demonstration and instruction work which will be followed out during the coming year by the Agricultural Commercial association. A committee has been appointed whose duty it is to outline the year's work so that the most important problems in the county will be taken up, and more be accomplished by effort being directed along these given lines.

No Scarcity of Wheat

J. R. Forsyth

There has been considerable talk about the price of wheat for the year 1915. Some think the price must necessarily be high on account of the present war in Europe. At this time I believe the prospects are as good if not better for low prices next fall than for high prices. From all reports I can find there was the largest acreage sown in fall wheat known in the history of the world, and many contemplate that the largest acreage of spring wheat will be sown. If this is a fact and there should be a fair yield per acre there will be the largest production of wheat known in the history of the world, and whether the war goes on or ends, there will be plenty of wheat to feed all nations. Now I am speaking of this as a farmer and not as a miller, and I think we had all better study the case well before we jump at the decision to plant all wheat. I think that the farmer who diversifies his crops —plants some wheat, some oats and barley, and some sugar beets or other cultivated crop, will come out ahead in the long run. This has been my experience and I have farmed in Colorado for forty years.

Of course it has been said that history repeats itself, and that after the Civil war wheat was higher for some years than it was during the war. That is true but conditions are not the same now. Then there was but a small amount of wheat raised in this country, and in Canada, Russia, Argentina, and Australia almost none at all. There is a larger number of bushels raised now per capita than there was at that time.

Livestock Market Letter

Ben Kemper, Pres. Denver Livestock Com. Co.

Since our February letter the condition of the market has been worse than we anticipated, brought about largely by the new outbreak of Foot and Mouth disease in four prominent counties of Kansas, and the continued advance in the price of corn. This has caused Kansas, Missouri, Nebraska, Iowa and Illinois to liquidate their cattle without regard to prices. Corn in these localities selling largely from 70 to 80 cents per bushel, and the danger of the Foot and Mouth disease that they would be quarantined for an indefinite period has scared the feeder and he has sacrificed his cattle. The condition of the Foot and Mouth disease in Kansas is improving, also in Iowa, and we feel that if they continue to improve, that we have seen the low time. These cattle last Monday at all markets were 75 to $1.00 per hundred lower than they were 30 days ago. We feel that where feeders are in shape to take care of their cattle for from 40 to 60 days, we will see a much higher market, in fact we don't see how these receipts can continue, and that we will wake up some morning with a big shortage of fat cattle. On the other hand, we realize that the demand is not as good as it has been in previous years, and we realize that the conditions prevailing in Europe will hinder the exportation of beef, but we also want to realize that a hungry nation will provide some means to get supplies, and we think they will in this case.

Prices on our market for the week on best steers ranged from $6.80 to $7.25, the bulk of the fat steers selling from $6.65 to $6.80. Best cows and heifers from $6.00 to $6.35. Pretty good cows selling from $5.50 to $5.75. Bulls largely $5.00 to $5.50.

A Just and Equitable Proportion

Hans Mendelson

The Farmers' Congress held at Fort Collins January 11-16 this year, passed the following resolution among others:

"Whereas, A special effort is being made at this time by the Executive Committee of the Interstate Farmers' Association to get the beet growers in Montana, Wyoming, Nebraska and Northern Colorado to pool their acreage and place it in the hands of said committee, believing that such a move is necessary on account of the European war in order to share in the just and equitable proportion of the unusual prosperity that is sure to come to the sugar beet industry; therefore, be it

"Resolved, That we, the delegates to the Sixth Annual Session of the Colorado Farmers' Congress do hereby indorse the efforts being made by said Committee."

It must be said without any hesitation that efforts to obtain a "just and equitable proportion" of anything to be shared by different parties can be indorsed by all these parties, although it seems that a demand to a just share of "unusual prosperity" should be accompanied by a guarantee to bear a just share of "unusual adversity."

However in each given case it must be determined who are those parties entitled to a share in the proceedings and what exactly is a just and equitable proportion of it for each of the parties.

In the process of making sugar the following parties are involved:

1. The Capitalists who build a factory and furnish the working capital without any assurance whether or how much raw material is forthcoming.
2. The Managers of the business, representing a staff of men usually with specialized training in finance, trade, engineering, science or agriculture.
3. The Landlord furnishing the farm on which the beets are grown.
4. The Farmer or Tenant whose labor and equipment

together produce the growing crop influenced by good or bad seasons.

5. The Labor employed on farm and factory.

6. The Distributing Agencies from the jobber down to the retailer.

7. Last, but not least, **the man who pays all the above-mentioned parties, the Ultimate Consumer.**

The men in these groups may be represented in more than one group. Some of the stockholders may be actively engaged in the managing of the business, a farmer may be landlord and laborer at the same time and a retailer of sugar may also raise some beets. All of them are, at any rate, consumers of sugar.

The total output of the Great Western Sugar Company during the last two years at the average rate of consumption per head per year would have furnished a year's supply for a little over five million people. This would approximately represent the population of Colorado, Wyoming, Montana, North Dakota, Nebraska, Kansas and New Mexico, if nobody else was selling sugar in these states besides the Great Western Sugar Co. Of course there are other beet sugar factories in this territory and there is also quite a little cane sugar consumed.

Numerically, the consumers are the strongest group among those entitled to a share. A statesman engaged in the adjudication of the claims of all these groups and guided by the principle "the greatest good to the largest number," certainly should take this group into consideration first. Recent political events have shown that a large number of people in the districts producing beet sugar believe the price of sugar too high, else they would not have voted for candidates advocating free sugar.

The next numerous group is that of laborers. The number of farm laborers in the Great Western Sugar Co factory districts is probably not less than 18,000; the present labor in the factories about 800 and the temporary campaign labor about 3,000.

Next in numbers is the group of landlords, tenants and farmers, between 4,000 and 5,000.

The other group of capitalists, managers, and distributors are numerically comparatively small.

Of course nobody will argue that the share of these groups should merely be judged by numbers.

The fact that the supply of men with capital to build factories, men with skill to manage them and men with farms capable of producing beets is relatively scarce enables these groups to obtain a larger share of the proceeds than the other groups.

Nevertheless a just and equitable scheme of distribution must take ALL of these groups into account or else the scheme is lopsided, particularly when it is considered that five million people have more votes than 50,000.

Now then, where is the Solomon who can furnish reasonably low-priced sugar for the consumer, reasonably high wages for the laborer and reasonable profits for farmer and factory at the same time?

There are enthusiasts within and without the interested groups believing that such a solution is possible, but not under the standard of business conduct generally practiced in all the groups now.

It is not probable that these enthusiasts form now a majority of the capitalists, or the farmers' union, or the landlords.

It may be said that today factors beyond our control influence demand and supply of sugar and therefore the price of it. Consequently let us charge what we can get.

It may be said that demand and supply of labor establishes the wages, therefore let us pay wages high enough to get the labor and no more.

It may be said that the relative number of landlords and tenants sets the price of rent. If there are more renters than farms to rent, the price of rent will go up, and vice versa it will go down. Therefore the rent we charge is just, as long as we can get tenants.

Everything seems to be regulated by demand and supply, why not let the price of beets be regulated by the same method?

Some farmers say, "There are many producers of beets and only one buyer, the Sugar company. There is no play

of demand and supply. Therefore let us organize all farmers into one whole and we will have the same strength as the company."

This is theoretically correct. But organization is effective only when it is organized information, but not when it is only organized emotion.

A Look Ahead

Frederic W. Taylor

Anyone can look back, and no one likes to assume a prophetic vision, and assume to say what is going to happen in the future.

But there are some things that we have a right to use as a basis for assuming as to what is to occur, along certain lines.

In the first place, in all human probability, the frightful war now under way in Europe has only well started. It does not seem possible, at this time, that it will end until at least after the marketing of the crops that we are to grow in Colorado in 1915.

They attempt to tell us that the women will do the work, while their menfolks are away at the war. We know though, that women in Europe do a lot of the work in the fields, under normal conditions, and that their number will be little or no greater, so far as those who will work in the fields is concerned, than in normal times. For many must take up unusual duties, nursing, driving street cars and many other men's jobs. So there is not a particle of doubt that every country at war is at a great disadvantage in the production of crops.

Much fine agricultural country is being devastated by the war, or is so situated that it would be folly to plant it, even if labor and seed and implements were available, which they are not.

So, I am sure, we are fairly entitled to feel positive that what we raise will find a ready market, at a good price. Because we feel sure of a good price, shall we

slacken our efforts, in the feeling that we may take it easy, because we will be well paid any way?

Never in the world should we, or will we look at it in this way. On the other hand we all want to take advantage of this opportunity of a life time, and raise bumper crops, for no one can tell what will be the market for our food products, while things are being readjusted after the war is over.

Every scrap of manure should be put where it will do the most good, every plow set a little deeper than heretofore, every fence row cleaned up and made to grow a crop of something besides weeds, and every muscle strained to get what is coming to us, this year, if we do our part.

I have been, a good many times, over some of the ground now being fought over, and at one time or another over most of it, and only a year ago last fall went from Vienna to Warsaw, through Cracow, where heavy fighting is now going on. And after a good deal of observation of the military and agricultural conditions which exist in Europe, there seems no possible way to supply the warring nations with food, in sufficient quantities without drawing on us for a good deal of it. They must have it, and we can supply it, at pretty much our own price. So I can see none but a bright outlook for our food products, wheat, sugar, beef and all the lesser items that we will have for sale.

And we ought to bear in mind that when the war is over and the time of settling down comes, there may be a year or series of years, in which we will need to have some surplus to draw from, while we are trying to find out just what new conditions are to prevail for such a breaking up of traditions and conditions has never happened in our day, or perhaps in any other.

So I am sure that so far as this year is concerned, it is only a matter of deciding upon those crops which our soil is best fitted for, just now, and which our experience best fits us to grow, and to try our best to grow better crops than ever before, and at the same time study the indications, throughout the year, so as to be ready to get off on the right foot next year.

The Foot and Mouth Disease

C. F. Schalle

The term Foot and Mouth disease when used in Colorado arouses but passing interest, but in those districts that have been devastated by the disease, or in sections adjoining where the people have had an opportunity of learning the terrible effects of the disease, it spreads terror among the cattle men and farmers whenever it is heard. The present epidemic is the sixth that has visited this country in the past fifty years, although this is the first real general epidemic that we have had to contend with and at the same time it is worthy of note that each recurrence seems to be more contagious, or at least appears to be more difficult to control and in consequence covers more territory.

What is Foot and Mouth disease? This is a question that is rather difficult to answer intelligently except in a general way, from the fact that while it is acknowledged to be a germ disease the germ is so infinitismaly small that no one has been able to isolate it and learn its life history, although the disease has been prevalent in Europe for the past two hundred years. All information therefore is based wholly on observation, and this in a measure accounts for the diversity of opinion in regard to the best methods of handling or supressing the outbreaks. In a general way then, the disease is a systematic or blood disease with local manifestations in the mouth and intestinal tract and upon the feet and udder. The local lesions appear first in the form of blisters quickly followed by ulcers. They may appear at any one of the above mentioned points first. An attack of this disease confers no definite immunity, the animals being subject to another attack upon exposure in a few weeks after recovery. In large herds through which the disease travels slowly, the

animals first attacked may become infected from the last animals suffering from the disease after which it has been known to affect practically the whole herd again, making a circle of infection covering months.

The method adopted by the Bureau of Animal Industry to suppress the outbreak is to kill all animals that have the disease or that have been exposed to the infection, and right here is where all the trouble has started between the cattle men and the State and Government officials, as it is a difficult matter to convince the average farmer or cattle man that because he has one or two sick animals among his cattle, sheep or hogs, that it is absolutely necessary to kill all the cloven hoofed animals on his place, and yet that is what is done in every instance where the disease is found. The disease in Illinois was mostly of a mild type and frequently the diseased animals were on the road to recovery before the trenches were dug in which the animals were buried after being shot by the Federal authorities, and the question was frequently asked and debated: "Why kill animals that were recovering or had recovered from the attack?" I will quote Dr. C. J. Millen of the Bureau of Animal Industry in reply to this very pertinent question:

"Feb. 4, 1915:---It is now well known that in many infectious diseases, some of the persons or animals that recover, remain carriers of the infection, for months and years after; the germs of the disease being hidden away in the body, slowly multiply and are eliminated through one or more channels, either constantly or intermittently during the time, thus infecting their surroundings and passing the disease along to other subjects. This has been definitely proved to be the case in typhoid fever, in which recovered cases of the disease have been proved to remain carriers for as much as twenty-six years after recovery; and numerous outbreaks of the disease have been traced to milk infected by such persons. Diphtheria is another such disease, but in this the infection does not persist so long, but may remain for months after apparent recovery. In the venereal diseases chronic carriers are very common. In animals such diseases as Texas fever

and infectious abortion are excellent examples of this class of diseases; in the former nearly all animals that recover harbor the germs of the disease in their blood for years; in the latter we have proved that most cows that have aborted because of this disease, eliminate the germs of the disease with their milk for at least six years; how much longer we do not know because our tests have not gone farther at the present time.

It is believed by some of the best authorities on the subject that the foot and mouth disease belongs to this class of diseases and that a considerable portion of the recovered animals may remain carriers. It is reasonable to believe this, since it is a disease in which the blood stream becomes infected and the disease germs carried to all parts of the body. It can thus be readily seen that a recovered animal would be unsafe unless it had been tested by exposure of healthy ones to it and found to be free from disease germs. The test would necessarily have to be made under perfect quarantine conditions such as are not possible on the farm.

There is another great danger in connection with infectious diseases; that is the mild unobserved cases. We have in human diseases the so called walking typhoid, in which the patient, while sick, does not show sufficiently characteristic symptoms for the disease to be recognized, and yet the patient has the power to pass the infection on to others through food and milk that he may handle. Many an attack of what has been called sore throat and tonsilitis has been responsible for outbreaks of diphtheria in diseased or exposed stock, or exposed children. In animal diseases the mild unobserved cases cause any amount of trouble in such diseases as Texas fever, hog cholera, tuberculosis, glanders, etc.

It is because of the possibilities of the chronic carriers and mild, unobserved cases that the Bureau of Animal Industry is taking so much trouble to make house to house inspections for a radius of several miles around each infected farm. Two or three of these inspections will be

made to make sure that no infection had been overlooked. We must bear in mind that this pernicious invader must be entirely driven from the country. Good progress is being made and let's hope that the work will soon be accomplished and this great scourge will never again be with us."

This is the scientific side of the proposition and no doubt in a measure is true, and if true, the slaughter of infected or exposed animals is justified. The large herd of dairy animals that were on exhibition at the stock show in Chicago last winter, became infected and as there were six hundred highly bred and registered animals in the herd valued at Three Million Dollars, it became a question of expediency with the State Officials of Illinois as to the advisability of destroying the herd, and thereby rendering the state liable for fifty per cent of the value of the herd, especially as the greater part of the herd was owned in other states. The owners of the animals in this herd then made the state officials the following proposition: They, the owners, would isolate the entire herd, maintain a strict quarantine at owner's expense and observe such rules and regulations as the officials in their wisdom might deem necessary to impose. This proposition of the herd owners was accepted by the state officials and the herd was quarantined. The following statement was issued in behalf of the herd owners about February 1st:

"The owners of the dairy herds that have been in quarantine in Chicago since the close of the National Dairy Show, Oct. 31, last, held a meeting in Chicago last week, and after receiving a report from the attending veterinarian, Dr. Joseph Hughes, that the cattle at the present time are well, decided to go forward with such tests and further experiments as may be decided upon by the authorities as necessary to determine that the cattle are non-carriers of infection.

"It is the hope and belief of the owners that they will demonstrate an important, economic proposition in the treatment of Foot and Mouth disease, and, without desiring to enter into any discussion of the manner in which

their cattle contracted the disease, they feel that they were favored by being in an absolutely isolated location when their cattle were quarantined, consequently in a position to ask for and have granted them, the right to carry the herds through the disease, for the purpose of acquiring more scientific data on the disease than that now in existence in America.

"From present conditions the owners believe that an advanced and important step was taken by the Honorable Secretary of Agriculture, in agreeing to their proposals to save the cattle. While the owners recognize that it is not in their province to make any recommendations to other cattle owners whose herds have taken the disease while located on their home farms, yet they will say that the expense of maintaining quarantine makes it an economic necessity to accept fair valuation for ordinary grade cattle, and submit to the slaughter of such cattle, to aid the authorities in suppressing the disease, so that the markets for dairy products and meats may be kept open.

"If the State and Federal authorities having in charge the eradication of the disease are in a position to give adequate compensation for such cattle as are slaughtered, the objection to present methods will largely disappear. When a quarantine can safely be conducted on cattle of high breeding value, whose blood represents years of work upon the part of the breeders, it most certainly should be maintained in fairness to owners and taxpayers, for the reason that what might be considered fair monetary value on such cattle would not compensate the owner, while it would eat into the state revenues very heavily should the disease spread among herds of such a character.

"The show herds are apparently in as good condition as to flesh and performance and general health as at the time of showing before the judges. None have died from Foot and Mouth disease except calves born while mothers had the disease and which were nursing while mothers were in acute stages; with this considered the mortality rate of calves has been no greater than ordinary farm conditions encounter.

"The owners desire to in every way co-operate with the

authorities in carrying their experiment to a conclusion which they firmly believe will be eminently successful."

From this report it would seem that the herd has fully recovered and it now remains to be seen if the theory of the government experts that recovered animals are still carriers of the disease, is true or not. If the future demonstrates that the herd is free from the disease, and the animals are non-carriers, then the question that presents itself to the mind of the owner of an infected herd, is this: If a five hundred dollar cow can be cured why not a fifty dollar steer? Germany has been fighting the disease for years by quarantining, and yet the disease has steadily increased until the year 1913 when the disease was more widely spread than ever before in the history of that country. In that year 3,366,369 cattle, 1,602,927 sheep, 53,674 goats and 2,555,371 hogs were affected with the disease. Similar statistics could be cited from several European countries in which the policy adopted consisted in endeavors to control the disease by quarantine measures.

England has fought the disease by quarantine but lately has in several cases destroyed the herds, so that today she is practically free from the infection. All animals in a herd do not become affected and in one known case in Illinois a farmer had two cows which had the disease, and each cow had a calf, both of which fed themselves by sucking. But both calves continued healthy. The farmer and his men milked these same cows, and washed their hands in a tub of water. Then he had an apparently healthy cow drink from the tub and in eight days she died from the disease.

The present outbreak first appeared at Niles, Michigan, August 23rd, when the local veterinarian was called to inspect three dairy cows in a large herd of Holsteins. He was undecided as to the nature of the disease and therefore called on the State Veterinarian and after inspection they both concluded to refer the matter to the Board of Animal Industry at Washington, and sent samples of the discharge from the ulcers to have a microscopic examination, and a diagnosis made by the experts in the Depart-

ment. The local veterinary testified that he received a reply the 25th of September in which the Department decided it was not Foot and Mouth disease. In the meantime the disease had spread so rapidly throughout the surrounding territory that one of the expert pathologists of the Department at Washington was sent out to make a personal investigation and when he inspected the first herd he pronounced it Foot and Mouth disease and quarantined the surrounding territory in Michigan and Indiana, From here it was carried to the stock yards at Buffalo and Chicago and in a few weeks Pennsylvania and Illinois became the two worst plague spots in the country. From the Chicago stock yards the disease was carried throughout central and northern Illinois and the central West. Within sixty days 46% of the entire infection in the U. S. was in the state of Illinois owing largely to the fact that more cattle were placed in the feed lots, from the infected stock yards of Chicago and also from the fact that when it broke out the state was totally unprepared to cope with the disease and there was not much done in the way of systematic suppression of the outbreak until the federal authorities came to the state's assistance by offering to pay fifty per cent of the value of the herds destroyed, and the state to pay fifty percent and the federal government also paying cost of disinfecting premises, and paying for the cost of buildings destroyed, when necessary to do so to thoroughly disinfect premises. Where infected animals had been housed or stabled, the inside of such buildings were torn out and burned. The exposed sides of straw and hay stacks were cut off and burned. All feed racks, troughs and mangers torn out and burned; the manure in yards, stables and pens raked up and covered with disinfectants. All exposed fences, yards, runs and pens sprayed with a solution of chloride of lime, and the people who lived on the premises were first quarantined and afterward disinfected. The Department also issued the following notice:

"HERD OWNERS, to protect your cattle, keep away from other people's stock and keep others from your

stock. Keep cattle closely corralled. Provide yourself with special outer clothing to be used while among stock and for no other purpose. Keep crows, birds, dogs, etc., away.

"As to the inspectors engaged in this work they are regular federal civil service employees working on yearly salary and are instructed to carefully disinfect and fumigate after inspecting one man's stock and before entering next premises."

It can readily be seen from the above that a visitation of this dread disease is anything but a blessing.

Since the first case at Niles, Mich., the disease has spread from the New England states on the East to Washington and Montana on the West. The work of destroying infected herds was stopped ten days in Illinois by court proceedings and during that time the disease again began to spread. When the work of destroying the herds was stopped there were twenty herds awaiting slaughter and when the work was resumed the number of infected herds had decreased to sixty. At first there was a desire on the part of some of the men who owned infected herds to conceal the fact, but after the virulent nature of the contagion became better understood this feeling disappeared and now owners of herds in infected districts co-operate earnestly with the federal officials in stamping out the disease.

In one instance in Michigan a man fed some skim milk from a creamery to a calf which later developed Foot and Mouth disease. It occurred to him to kill the calf and say nothing about the matter. The neighbors, however, obtained some inkling of the facts and notified the authorities. After he had been forced to admit that he had killed the calf the body was dug up and unmistakable marks of the disease found upon it. Within two weeks all the rest of the herd was infected and had to be killed.

In addition the owner was fined $20 for breaking the quarantine regulations. The sentiment of the whole community, it should be noted, was against him.

In another case in Michigan an individual with a weakness for dogs, of which he owned five or six, ignored the

regulation which required all dogs to be tied up in order to prevent their picking up and spreading the disease. With him, as well as with the calf owner, it was the neighbors who objected. The sheriff tied up the dogs and their owner paid a fine of $23.00. A week or ten days afterwards he was punished more severely by the loss of all of his cattle which came down with the disease and had to be slaughtered. There had been no previous outbreak in the community for three weeks. Although dogs, as in this case, and chickens unquestionably act as mechanical carriers in spreading the disease, in Indiana and Michigan the creameries were found to be one of the chief sources of the contagion. One of the first steps taken by the authorities was to insist upon the creameries sterilizing the skim milk and whey before they were returned to be fed to stock. At the beginning of the campaign in Berrien County, Michigan, there were at least 170 herds infected in an area approximately 18 miles long by 8 miles wide. Of this infection 70% was traced to skimmed milk returned by the creameries. After the order requiring sterilization went into effect, one establishment allowed its apparatus to get out of order and three days went by before it was repaired. Infection in 33 herds was traced to the carelessness of these three days.

In Allegan County, again, there was one small herd affected, the owner of which was one of 59 patrons of a creamery. Though he delivered milk to it for only one or two days, this was sufficient to infect twenty-one herds and it was considered fortunate that all of the fifty-nine patrons did not suffer.

From such experiences as these, live stock authorities are more than ever convinced that skim milk should invariably be sterilized.

The state of Washington had but one infected lot of cattle. This was a lot of Holstein cattle shipped from St. Paul and in which the disease manifested itself **en route.** The Montana officials refused to allow the cattle to be unloaded in that state and the Washington officers had the pit prepared for them on arrival in the state and they were unloaded from the cars and killed at once.

When a herd is to be destroyed a pit is dug eight feet deep, the cattle driven in the pit and shot, then covered with quick lime and the pit filled up. To show how serious the disease is considered by the authorities at Washington, I quote from the bulletin issued in a local Illinois paper by Dr. C. J. Millen, who has charge of the work in that section:

"Europe has temporized with Foot and Mouth disease for 200 years until nothing else is possible for them at this time and the best authorities report enormous yearly losses from its ravages, ranging in Germany alone as high as $25,000,000 in one year. They think it worse than all other contagious diseases of animals combined. Because the death rate is low, many people do not appreciate the seriousness of it. Just consider all cloven footed animals are susceptible, it is so contagious that practically every susceptible animal in the country would have it if it were not wiped out; and that it causes a direct loss upon every animal affected. Place this loss for cattle at the conservative figure of $10 per head per year, since it would average to sweep the community about once a year and many herds more often, carry this for ten years as a tax upon live stock industry of the country, and determine if you would rather submit to the temporary inconvenience of a quarantine with the loss of comparatively few herds or be handicapped forever with a quarantine and Foot and Mouth disease in the bargain. Furthermore we don't believe that $10 per head would cover the cost of the quarantine, dead animals, depreciation in value of animals from loss of condition, complications and after effects. These after effects are often of a serious nature, especially in breeding and dairy animals, making some herds practically worthless from abortions, gargots, foot lesions which refuse to heal, etc. To cite examples, several herds were not reported in the 1902 outbreak in New England and Dr. U. G. Houch of this bureau gives the following history of one of them:

"He called at the office ---------- and requested that his herd be spared as it had passed through the disease several weeks before and was now in good condition. He

stated that the lesions were all healed, that the animals were all eating, cows were all coming back to their milk * * * * * It was finally decided to clean and disinfect the premises, spraying the animals with disinfectant, apply a disinfectant to their feet and allow the herd to live. In about three weeks the owner called at this office, and stated that his herd was not doing as well as he expected; that some of the cows had gargot; many of them aborted; the calves had died; he had lost one of the cows; they were not giving more than one-half to two-thirds of the milk they gave before they had the disease, and in general the results were proving very disappointing to him. He was advised that the fact that this herd was proving a financial disappointment was no good reason why the federal government and state of Massachusetts should not buy and slaughter the animals if there was no danger of their disseminating the infection of the Foot and Mouth disease. The owner again returned in a couple of weeks and stated that if we did not slaughter some of the animals he would do so himself as their condition was such that he could not keep them on his place. I again visited the herd and found, as I recall it, 19 gargot cows. Two of them in particular showed udders so distended and sore that they shifted their weight from one hind foot to the other so as to avoid pressure on the sore udders which were filled with pus. These animals were not eating and had become very thin, so thin that they would not be recognized as the same animals I had seen at my first visit. Many of the animals were lame and the soles of the foot loosened so that a knife blade could be passed between the sole and the foot from heel to toe, and when they placed their weight on their feet, there was a sound similar to that of a man walking in boots containing water. It was finally decided to slaughter the infected animals as there was danger of their being sold to some butcher and probably start infections in new places. I have personal knowledge of eight herds that were spared in that outbreak. The owners of siv of them reported the unfavor-

able conditions and it was necessary to slaughter some of the animals in each of the herds in order to prevent the further spread of the disease. Later in the spring an owner of one herd that had been spared came to Boston and reported that he had been a "fool" in not reporting his herd and having them slaughtered as it had been found necessary for him to sell 70% of them to the butcher in the spring as their usefulness for dairy purposes had been impaired with the disease so that they were no longer profitable."

Montana took less time to stamp out the disease than any other infected state considering the number of cattle infected and the fact that some were running on the range. It demonstrated the value and necessity of prompt and efficient methods at the start of the first case of infection.

After it had been introduced at five points in Montana, 1418 cattle, 238 sheep and 11 hogs were buried in the trenches and all the premises were disinfected and held in quarantine. After 30 days no other cases of infection have been reported and Montana is ready for release from quarantine. Had Montana followed the example of some of the Eastern states and temporized with the infection, or if she had had men at the head of her Animal Industry that knew more about politics than they did of the importance of the Animal Industry of the state, the Foot and Mouth disease today would be thoroughly established in the Western range country and with it the paralyzing of the entire cattle industry.

The following table shows the conditions existing throughout the infected states Feb. 1st. Since then there have been a number of newly infected herds, especially in Illinois:

States	No. Counties Infected	No. Herds Infected	No. Cattle Infected	No. Sheep Infected	No. Swine Infected	Total No. Animals Infected	No. Herds Awaiting Slaughter	No. Premises to be Disinfected	Remarks
Conn.	2	24	538	0	105	643	0	0	Completed.
Delaware	1	12	152	22	49	235	0	0	Completed
Dist. Col.		2	23	0	5	28	0	0	Completed
Illinois	51	568	19630	535	24165	44342	25	60	See footnote
Indiana	19	104	2354	636	3855	6804	0	0	
Iowa	6	39	1313	32	2057	3402	5	6	
Kentucky	9	46	809	0	308	1127	0	0	
Maryland	10	39	744	197	531	4771	0	0	Nearly cmpltd
Mass.	9	58	1235	61	3471	4771	0	3	2 new herds
Michigan	16	240	1242	829	4019	7790	0	0	nearly cmpltd
Montana	3	32	1408	273	11	1656	0	0	Completed
N. Hamp.	1	3	78	0	26	104	0	0	Disin. cmpltd
N. Jersey	5	24	791	6	193	990	0	0	Nearly cmpltd
N. York	12	86	3570	60	267	3924	0	1	Nearly cmpltd
Ohio	33	183	3293	2648	4562	10540	0	0	Nearly cmpltd
Penn.	28	703	11575	273	6637	18488	2	4	see footnote
Rhd. Isld	3	40	828	1	135	964	0	2	Nearly cmpltd
Virginia	1	1	19	0	0	34	0	0	Completed
Wash.	1	1	102	0	0	102	0	0	Completed
Wis.	10	36	1352	1764	1323	4440	0	0	Disin. cmpltd

Illinois---All premises where herds have been slaughtered have either been disinfected or are being disinfected. Animals of herds awaiting slaughter not included in total number of animals, as reports on herds awaiting slaughter are not complete.

Pennsylvania---Work of disinfection started as soon as slaughtered animals are buried. Few new herds.

A. D. MELVIN, Chief of Bureau.

U. S. DEPARTMENT OF AGRICULTURE

Progress in Eradication of Foot and Mouth Disease

Feb. 3, 1915. Probably the most noteworthy event of the past month has been the re-infection, and subsequent temporary closing of the Union Stock Yards of Chicago. Pittsburg, Buffalo and several smaller yards in various states were also re-infected through shipments of stock from Chicago, but beyond the loss to shippers through closing these markets, and the expense and trouble of disinfecting the yards, it is hoped that comparatively little damage has been done. The result may in the end be, to an extent, beneficiary, in teaching to some of the public a lesson of "eternal vigilance," necessary in completely eradicating the disease. While the greatest danger point seems to have been passed, a small amount of laxity may undo the good work accomplished.

By the shipment of a carload of infected milk cows from Fon DuLac, Wis., to Wichita, Kansas, four counties in Kansas have been added to the quarantine list. The counties are Sedgwick, Butler, Sumner and Cowley. Full particulars regarding this shipment have not yet been received.

Illinois continues to be the field of greatest activity. A number of inspectors have been added to the force in that state and every effort is being put forth to wipe out the disease. Thirty-seven herds remain to be slaughtered at the last report.

Four additional cases are reported from Iowa, with no new territory involved.

In New York one more county is under quarantine, an infected dairy herd having been discovered in Herkimer County.

Work is nearly completed on the last premises to be disinfected in Kentucky, should no new cases be discovered. Massachusetts reports disinfection well under way on the last three premises discovered--all large hog farms.

In Kentucky the farm-to-farm inspection work was expected to be completed by Feb. 1st. In Delaware all work has been completed.

B. A. I. Order 232, effective on and after Feb. 1st, issued by the Secretary of Agriculture, gives in detail all free, closed, exposed and modified areas.

Many inquiries are being received regarding the time which should elapse between cleaning and disinfection of the infected farm and the restocking of the same. Dr. A. D. Melvin, chief of the Bureau of Animal Industry has issued a circular letter regarding this in which he states "As a general rule this time I believe should be sixty days and in those cases where it is possible even after 60 days it would be well to put in only a few animals until it has been determined whether they escape the disease."

(Signed) C. J. MILLEN,
Per Cotton.

What effect this epidemic will have on the cattle market is a question that is agitating the minds of the feeders throughout the country. The immediate effect is to destroy all competition at killing points, with the result that the packers are reaping a harvest. It has been emptying the feed lots in all the infected districts, causing unprecedented runs of cattle at the killing points with a consequent demoralization of prices. Chicago had a run in one day of 48,000 cattle, every one of which went to the killers. The previous high run at Chicago was May 6th, with 42,000 cattle, but of this number it was estimated that 25,000 were returned to the country as stockers and feeders. Within a week the market on beef steers dropped $1.25 and has been demoralized ever since. Very little change has been noted, however, in the price of dressed beef. It is only fair to presume therefore, that considering the present depleted condition of the feed lots throughout the infected districts and the fact that we are importing no dressed meats at the present time, and the further fact that we are exporting a considerable amount of meats to the warring nations of Europe, there is no good reason why the markets should not react as soon as the various federal quarantines are lifted so that interstate cattle traffic can be resumed and the market be restored to a normal condition. When that time arrives I predict the highest prices for beef cattle that this country has ever seen.

Birds Destroy Insects and are Useful to Farmer

From U. S. Agricultural Department Bulletin

How birds destroy harmful insects and weed seeds may be useful to the farmer is described in a new farmers bulletin (No. 630) of the Department, entitled, "Some Common Birds Useful to the Farmer." The new publication has 27 pages and 23 illustrations (not colored) of the birds described. It contains much of the information included in one of the department's former publications entitled "50 Common Birds of Farm and Orchard." The department supply of this latter pamphlet has been exhausted and it can now only be obtained from the Superintendent of Documents, Washington, D. C., where it is sold at 15c a copy. It contains numerous colored illustrations of the birds mentioned. The new Bulletin, "Some Common Birds Useful to the Farmers" will be furnished free to all applicants.

Whether a bird is beneficial or injurious depends almost entirely on what it eats, says the introduction to the new bulletin. In the case of species which are very abundant, or which feed to some extent on the crops of the farmer, the question of their average diet becomes one of supreme importance, and only by a stomach examination can it be satisfactorily solved. Field observations are at best but fragmentary and inconclusive and lead to no final results.

Birds are often accused of eating this or that product of cultivation, when an examination of its stomach shows the accusation to be unfounded. Accordingly the Biological Survey has conducted for some years past a systematic investigation of the food of those species which are most common about the farms and gardens.

Within certain limits birds eat the food that is most accessible, especially when their natural food is scarce or wanting. Thus they sometimes injure the crops of the farmer who has unintentionally destroyed their natural

food in his improvevment of swamp and pasture. Most of the damage done by birds and complained of by farmers and fruit growers arises from this very cause. The berry bearing shrubs and seed bearing weeds have been cleared away, and the birds have no resource but to attack the cultivated grain or fruit, which have replaced their natural food supply. The great majority of land birds subsist upon insects during the period of nesting and moulting, and also feed their young upon them during the first few weeks. Many species live almost entirely upon insects, taking vegetable food only when other subsistence fails. It is thus evident that in the course of a year birds destroy an incalculable number of insects, and it is difficult to over estimate the value of their services in restraining the great tribe of insect life.

In winter, in the northern part of the country, insects become scarce or entirelv disappear. Many species of birds, however, remain during the cold season, and are able to maintain life by eating vegetable food, as the seeds of weeds. Here again is another useful function of birds in destroying these weed seeds and thereby lessening the growth of the next year.

The new publication discusses the food habits of more than fifty birds belonging to 12 families. Many are eastern forms which are represented in the west by slightly different species or sub-species, but unless the food habits differ they are not separately described. Among the popular birds included are the robin, bluebird, red and brown thrasher, cat bird, bobolink, oriole, crow, cuckoo and American sparrow.

$1.000,000 A DAY

The sugar bill of the American people is a million dollars a day. At present more than half the enormous amount of sugar which this represents is brought from abroad. Growing all this sugar at home will give employment to hundreds of factories, tens of thousands of farmers, hundreds of thousands of workmen.

USE SUGAR MADE IN U. S. A.

—From "Facts About Sugar," February, 1915

Efficiency in Farming Measured by Labor Income

From U. S. Agricultural Department Bulletin

The term "labor income," so widely used as a measure of efficiency in farming, is very confusing to those who are in the habit of estimating profits in percentage of capital invested. The following illustration will make clear the relation between the two methods:

On a particular Indiana farm the capital invested was $20,716. The gross receipts for the year were $2,163 and the expenses were $878, leaving a net farm income of $1,-285. Now this $1,285 represents what the farmer got for his labor and the use of his capital.

In most industrial enterprises every one, including the head of the enterprise, receives a definite salary, and this salary is fixed by the law of supply and demand; hence net income is all credited to capital and is expressed in percentage of his capital. But the farmer has no fixed salary. The question arises, what proportion of the $1,-285 shall be credited to the farmer's labor and what proportion to the capital invested. There are clearly two ways of answering this question. One would be to estimate a fair wage for the farmer, say $325 for the year, and credit the remaining $960 to capital. The per cent of profit would then be found by dividing the $960 by one per cent of the investment of $20,716, which gives 4.6%. This is the usual method of expressing profit in industrial enterprises where every employee, including the head of the firm ,receives a wage or salary.

The difficulty in applying this method in farming lies in determining what is the value of the farmer's services. This difficulty has been met by assuming that his time is worth what he can make the business earn over and above a fair rate of interest on the investment. If this rate is 5%, then $1,035 of the net income of $1,285 represents interest and the remainder, or $249, represents the farmers labor income. Labor income is thus simply what the business earns over and above a fair rate of interest on the investment.

Farming and Housekeeping

Mrs. Ethel Mendelson

The farmer and the housekeeper have much in common. Their work has, I venture to say, more points of resemblance than any other two activities classed as man's and woman's. Also they are both praised in high sounding oratorical phrases in all public speeches and blamed in practically every other kind. They are told in one breath that they are the backbone of the nation and in the next that no mortals are so backward as they. But let them come forward to organize or start any sort of a concerted movement, the rest of mankind sees fit to resist because that is not in the scheme of the universe as hitherto planned. Anyone feels competent to tag them with the label of inefficiency and yet there is no great rush from outside the ranks to supply their places with people who know how things should be done. No wonder both have in the last few years sort of drawn off and taken a look at themselves as well as the rest of the world.

But to come back to the points of similarity in their occupations. Both are made up of many callings. Of the average housekeeper it is demanded that she be laundress, seamstress, cook, economist, teacher, nurse and at times a garden and a poultry expert. The farmer is by turns a mechanic, a veterinarian, a weather prophet, a manager of men, an accountant, a salesman, and, shall we add, a philosopher, all while indulging in the main pastimes of farming. So though their activities are in different fields, of both there is demanded a variety of knowledge and skill that the average city man gets along comfortably without. Having thus to expend themselves in so many directions there is developed in them the tendency to store up against the time of need. Their physical strength, fortunately, can still be maintained and even increased while being constantly used. Not so with money. They must do so much for a small cash return that women have obtained a reputation as close bargain-

ers and farmers as good savers. Mentally they don't throw away strength either chasing will o' the wisp ideas. In fact both are branded as conservatives. They do belie their kind when they turn either wasteful or radical.

A certain mental readiness and quickness is kept in them, though, by the fact that their daily programs are "subject to change without notice" from sources entirely beyond their control. This not just once in a while, but with a frequency that would soon put a city office in a state of chaos. A housewife's time belongs to anyone and everyone. Sometimes her carefully planned day is frittered away by thoughtless demands from others. Sometimes an unexpected visitor, an accident, a call of help from a neighbor may necessitate a complete change of program. If she is worthy her name she meets all that comes up cheerfully and competently. But to be alert and ready for anything precludes a deep absorption in any one thing. Concentration has never been a failing of women. No wonder some become planless and unsystematic in their work. They can all show you days when system would be all wrong. Also the farmer may plan and plan, but over night a rain will come and upset his careful calculation of how and when he will get a certain piece of work done. He may try to plan on a broad scale from the experience of other seasons. Every season seems to turn out an "exceptional" one. So it is natural we should find shiftless farmers as well as shiftless women. They have their excuses. But this very compulsion frequently to adjust oneself to unforeseen conditions develops in the good farmer and the good housewife a calm power to meet whatsoever may happen that makes nations rely on them in time of trouble. It also gives them an elasticity of mind that keeps them youthful longer than the rest of toiling mankind.

Now how do these two, who have so much in common, get along? Well, I have always felt I could depend upon a farmer's sympathy and understanding of my mental processes a little sooner than the same could be expected of other men. But this may be personal prejudice. I do not mean to say the farmer always understands the inconveniences and unpleasantnesses of housework. He

has even been a little backward in seeing them. Maybe because his own work has many such inconveniences and unpleasantnesses also. To say his work and his wife's are similar does not mean that they are the same. But that they are similar does mean they are apt to develop similar traits and should make for a mutual understanding of one another. How many city housekeepers, oh fortunate country women, even when they understand and appreciate their husband's work, can feel the kinship with it that you should be able to? I think I am safe in saying that a farmer and his wife in a divorce court is an unusual sight.

Growing Things That Pay

Gilbert Landell

As I travel around Colorado I cannot help noticing the lamentable fact that many tons of valuable feed are wasted each year on every farm and roadside, every pound of which should be profitably fed to dairy cows if the farmers only had them. There are months and months each year that are wasted by the farmer because he has no remunerative employment for his time. Many a farmer discharges a good man during the winter because he has nothing for him to do, and many a good man is retained several months in comparative idleness, not because the farmer needs him, but because he cannot replace him when wanted. Why not turn the idle hours of winter and wasted feed into good hard cash? Why not have an income for each month in the year?

And when the big beet check comes put them out at interest or use them for buying new pieces of land or new barns, etc., instead of paying out the bulk on accumulated store bills, interest, etc. Suppose a fellow goes out and farms systematically, planting so much to alfalfa, a few acres to grain and another big portion to beets. Rotate the crop, keep twenty cows and spread manure. Follow this system and the annual returns from the crops will be

at least as great as before the dairy was put in. The milk checks of from $75.00 to $150.00 per month will go far toward paying the store and labor bills and the big beet check will be mostly velvet.

It is not an ideal condition that I am describing, but one I have seen in actual practice on many Colorado farms. Milking is not a good vocation for a lazy man; it takes thrift and hard work, intelligence and perseverance, but it pays. Otherwise there would not be the increase year after year in the district about Johnstown and Fort Lupton in Northern Colorado. The fact that almost none of the dairymen quit and each year sees an increase, not only in dairying but in beet growing, while the quality of the farms is improving fast, even where already good, goes to show that the results are uniformly profitable.

At one time it was thought that the high priced land was too good for the dairyman. That was in the old days when the soil was mined, not farmed. Conditions have changed. The old time soil robber is losing out to the man who uses intelligence and industry. The better the farm the surer the returns. In the districts I have named the farms are perhaps the best in Colorado, and there is no question but they are the most uniformly prosperous. The dairyman needs the beet industry---the beet grower needs the dairy---and the two go hand in hand.

Farm Management

H. E. Miller

When asked to write on this subject I began to think of something along this line that I had done that could be called Farm Management, and being unable to recall anything of importance, I thought perhaps a better title would be "Farm Mismanagement." What is farm management? The best definition I can find is, the business end of farming.

We could help one another more by telling of our mis-

takes and failures rather than our successes. We tell of the big crop we raise on a certain piece of land, but say nothing of the poor one, or that piece of bare ground that we had to carry over. We just shut ourselves up on our own farms and do not know or care to find out what the neighbor to the north or south is doing, or how he is doing it. He may have some improvement on our method. One item we should pay more attention to is soil fertility. The most of us think we have just got 40 or 80 or 160 acres of dirt (not soil), and that is all we care to know about it. We just keep drawing on it and do not pay enough attention to our deposits. We are a good deal like the young lady who put a sum of money in the bank and they gave her a check book. Well, she bought everything she thought she needed and kept giving checks for it. Finally the banker called her up and told her she had overdrawn. "Why," she said, "surely not, I have several blank checks yet."

Now if the soil could only call us up when we have overdrawn on its fertility, there would not be as many crop failures.

We started out years ago with just a grain and hay line of machinery, next came the potato line, and about the time everyone who raised potatoes got nicely rigged up for that business along came the sugar beet, which called for a different line and more money invested in equipment. Now comes the question, are we going still farther and put in the silo and all it demands. If everyone who builds a silo has got to buy a corn planter, corn binder, engine, ensilage cutter, etc., you had better let it alone. Now this can be handled in clubs of ten. Let one man own the planter, another the binder and still another the engine and cutter, and agree on a charge per acre for the planter and binder and by the hour or ton for the engine and cutter. Then we can change work and push things along, as we only have ten days or two weeks to take care of corn for the silo, then let us take care of our part of this machinery. Too many use nature's machine shed, which consists of "weather board" sides, covered with sunshine. We leave a piece of machinery just where we use

it last, and then expect it to do good work. I have a machine shed 48x16 which is the best investment I ever made.

We will divide our farm management as pertaining to the raising of a crop, into four parts, namely: 1. Seed bed preparation. 2. Cultivation and irrigation. 3. Harvesting. 4. Marketing. In preparing a seed bed we may plow in the fall, work the surface in the spring, get a good seed bed and then spoil it all by planting, if early, too deep, or if late, too shallow. We must be governed by the depth of the warm soil, moisture, etc., cultivation and irrigation. I believe some of us would raise better quality crops by cultivating more and deeper and irrigating less. Keep the surface from cracking and thereby hold the moisture. If moisture is allowed to evaporate through cracks in the soil it takes out a certain amount of humus with it and reduces the fertility more than we realize. Now after we have grown our crops, let us stop a few leaks in harvesting them. Most of us can improve a little in gathering and saving most any crop. I find that if I intend to thresh from the shock, and perhaps wait from one to three weeks for a machine, that it pays to double cap all grain shocks.

Marketing. Let us put the article, whatever it may be, on the market in the very best condition we can, and we will be able to command a better price. I believe the time is not very far distant when everything we sell will have the producer's name on it, even to a pound of butter or an egg. We should all keep farm accounts and then we can tell which crop pays the best. The crop which brings in the most money may not bring the largest net returns. Let us keep books this year and begin now.

A good part of farm management is in the location of your buildings, not only in regard to being handy, but sanitary as well. Always put the house on higher ground than the barn and other outbuildings. Now in regard to the location of the farm: I would not want my farm located near Fort Collins, no, that is too far from the coal mines. Not near Loveland, that is too far from Boulder. Not near Platteville, that is too far from the mountains. Not near Lyons, because that is too far from Longmont.

THROUGH THE LEAVES

APRIL, 1915

Planting Gold Dust For a Harvest of Dollars

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Agricultural Notes

W. P. Hogarty

The work of growing our crop of beets will be well started and the planting nearly completed before the next issue of this paper, and the acreage contracted is the greatest in the history of the industry. Last year our growers gave us an average tonnage of 13.6 tons per acre. Forty-five growers grew an average of over 20 tons per acre, 264 growers an average of over 15 tons per acre, 325 grew 12 tons and under 15 tons per acre and 236 growers less than ten tons per acre. Why is there such a variation of the tonnage grown by the individual farmer? Do the 264 farmers growing over 15 tons per acre have better knowledge of beet culture than the others, or have they better soil conditions? We have growers who have grown beets for this factory every year of its history and never raised above a ten-ton crop, and on the other hand we have growers who have never grown below a 15-ton average. Just watch your successful neighbor, figure out where his methods are superior to yours, and get in on the honor roll of growing 15 tons or better. Spring conditions are very favorable for the germination of seed, and the man who has fall plowed does not need to worry over moisture conditions, and is two weeks, at least, ahead of the man who has to plow his ground this spring. Be careful not to plow your ground too wet, and work the surface as soon after plowing as possible, say every half day, and make your seed bed firm. Do not plant your seed over 1½ inches in depth, and in the fore part of the season an inch to an inch and a quarter is sufficient. We hope you will take special interest in your beet crop with a view of securing a better tonnage, and do not think there is any necessity of having as large a percentage of growers with a low tonnage as we had last year. We wish to assure you that you will receive our hearty co-operation along

this line and while we have but two field men they will be at your service every minute.

+ + + +

The Longmont factory has contracted for over 18,000 acres of beets for 1915. This is our limit, we will have to slice beets from 5,000 acres which are grown by our neighboring factories which will make a total of 23,000 acres of beets for the Longmont factory. The Scottsbluff factory at Scottsbluff, Nebraska, has 33,000 acres of beets contracted and could contract 10,000 acres more if they had the capacity to handle the beets. The Sterling factory with only one-half the capacity of ours has 20,000 acres contracted. Billings, Montana, has 25,000 acres, and so on.

+ + + +

We have plenty of moisture for the present, thank you.

+ + + +

There is a shortage of pulp as usual at this time of year and the cattle on feed are in far better condition than the market. Owing to a decline in the market on fat stuff the feeders have fed for a longer period than in previous years with a very satisfactory increase in weight gained. Cattle that have been shipped have shown gains of from 180 to 250 lbs. in less than five months feed, which is very good. This year has taught us that February and March do not always give us a satisfactory market, and to be safe you should have a supply of feed that will enable you to carry your cattle well into May. With our present silo capacity it is impossible for us to hold your pulp on account of the large proportion that has to go out during the operating season, which means in order to feed pulp direct from the silo more cattle have to be on feed than can be finished, and the only sure way for another season is to feed less cattle and store up sufficient pulp to extend your feeding operations after you are shut off at the factory. We have always tried to keep from having to ask the feeders to silo pulp as other factories have required their feeders to do, but I guess we will have to come to it.

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The growers will probably be pleased to learn that we are going to measure all of the beet land this year and

hope to have the work completed by the time you are through thinning.

+ + + +

The Great Western Sugar company has carried on the work of growing beet seed in a small way for the past few years, and are making plans this year to grow all of our seed in 1916, providing it is necessary, which will require upwards of 2,000 acres of beet seed. Our Mr. Maxson will have charge of the seed breeding, and Mr., John Comer, Agriculturist at the Windsor factory will be in charge of the seed growing. Mr. Comer is well qualified for this position having been agriculturist at Windsor for the past eight years, he is thoroughly familiar with the soils, water rights and climatic conditions of Northern Colorado, and has been very successful in his agricultural work, and especially so in the experimental work of growing "Mendelson" or unthinned beets the past season.

+ + + +

I wonder if those traveling past the factory appreciate the effort and condition in which we keep this mile of road. After every storm we have used the King drag and I do not know a piece of road that has as much heavy hauling over it and is in as good condition. How many of you have made an effort to improve the highway in front of your farm? I know some have, but if we would all do a little how it would improve the general condition. Some say they pay taxes to cover this work, but that does not seem to get the work done, and I believe the wear and tear on the vehicles would be enough less to pay for this work, to say nothing of the extra tonnage you could haul. The road men do some good but it is impossible for them to get over all of the road at the right time, besides the time they start is the time they should be through.

+ + + +

Again I wish to call your attention to the subject of beet labor. Family after family have been turned away because we had no place to send them, consequently the Scottsbluff factory will come to Colorado after their labor,

which will take the surplus, so if you haven't your labor, engage it now.

+ + + +

The question of molasses distribution has been almost as hard a problem this year as the pulp. It seems almost impossible to secure anything like accurate information from the feeders as to the amount they expect to feed, and as we have to make a reservation early in the season for our requirements for local consumption, you can realize the position we are in when we receive applications for 1486 tons and reserve 2000 tons and find then that we are 200 or 300 tons short of the amount necessary to carry our feeders until they desire to put their stock on the market. This was just our position this year and we were obliged to notify about sixty feeders that they had used up the amount they had reserved. We were fortunate, however, in being able to secure 250 tons additional which will tide us over for two or three weeks longer when we hope the market will be better.

In this connection we believe it would be a very advisable thing for all feeders to figure on a small ration of syrup all through their feeding season, increasing the amount as the season advances. This syrup is not an unknown quantity with us like the pulp, and there is no reason for there being any shortage if the feeders would only take this feed into consideration in their ration for the feeding season and make a reservation for the amount they expect to use.

Meteorological Report

	December		January		February	
	1914	1913	1915	1914	1915	1914
Max. temperature	54	53	63	61	68	59
Min. temperature	-14	-14	-19	-3	-4	-17
Monthly mean	21.7	16.5	25.9	30.2	31.8	26.0
Normal	26.2	26.6	27.2	33.9	33.9	27.0
Precipitation	0.22	4.23	0.35	0,07	1.39	0.10
Normal	0.75	0.36	0.48	0.43	0.65	0.71

Gleanings From the Season's Feeding

Earl T. Ludlow

If the last two years have been of any value at all to the feeder it is from the viewpoint of experience; because that and red ink are practically all he has to show for his investment and effort. If he has not profited by that experience he is twice loser. Now just what has changed the feeding business from a profitable vocation to that of a losing one is what should interest many of us. There may be a difference of opinion on some points but on many I think we are agreed if we stop to consider them carefully. The winter of 1913-14 we attributed our loss, and rightly I think, to the heavy storm, but barring the storm our profits would have been very light, in fact not enough to justify the risk of investment; but for the winter of 1914-15 we have no such excuse, because the weather was exceptionally favorable and consequently gains unusually large. "What then is the trouble?" we ask.

Let us begin then, where everything should begin, at the beginning. When the feeder first considered filling his fed lots last fall he consulted his banker and was confronted with the statement that money was scarce, and consequently, in most cases, he must pay a higher rate of interest. Thinking that in itself did not amount to much, however, he began to acquaint himself with feeder values. After several useless trips to Denver to buy feeders, he at last became accustomed to the high price and brought home some cattle that suited his particular fancy and looked cheaper to him than certain bunches that he had seen sell on some of his former trips. Now there are several hundred just like this one particular feeder, who may have been you or your nearest neighbor. Your beet fields were inviting your cattle, the weather was fine, the market was working steadily higher on account of the increased feeder demand---in fact, you had already lost money you thought by not having bought your cattle earlier and so you shut your eyes and bought. The packer also wanted supplies and must of necessity compete with

the feeder demand. The commission man's desk was overflowing with filed-away orders from customers who were growing dissatisfied because he did not buy them what they wanted. To him it meant in the end in buying and selling commissions one dollar per head and increased business. So he, as agent, competed with the feeder, who was unwilling to pay the buying commission, the commission man buying on orders, the speculator and the packer. What a difference from the competition when our feeder is ready to sell about five months later. Then, if qarantine conditions on account of the foot and mouth disease, are such as they were this winter he has but one buyer, the packer, who is thoroughly organized, who knows just how many cattle there are on feed and when they must go to market, and who has had to pay a heavy fine on account of a violation of anti-trust laws. He does just as you or I would do under like conditions; he buys as cheaply as possible.

The following table, I think will give a fair idea of the cost of feeding the past winter, based on the cost of feed, an average gain of 225 pounds per head during a feeding period of five months, and the average margin of 75c per hundred between markets, Denver being both the buying and selling market. The average feeder utilized his beet tops to start his cattle at a minimum cost of about six cents per day which I have taken into consideration on a five months feed, beginning November first and ending April first. The cost per month of feeding naturally increases as the ration is strengthened and the more concentrated feeds are introduced, but the four months I have based on what I would consider an average of the four months to properly finish a steer for the market.

Original cost of steer---1000 lbs at $6.50 per cwt		$65.00
Feeding exp.---first month beet tops at 06c per day		1.80
Feeding exp. per month for 4 months:		
Pulp, 125 lbs. per day at 75c per ton	$1.41	
Hay 10 lbs. per day at $6 per ton del.	.90	
Oil cake 1½ lbs. per day at $30 per ton	.68	
Syrup, 4 lbs. per day at $10 per ton	.60	
Labor	.50	
	4.09	
For four months, 4 x 4.09 equals		$16.36

Buying and selling expense:		
Buying and selling commission	$1.00	
Freight both ways	1.60	
Yardage and hay	.35	2.95
Interest on purchase price---$65.00 at 8%, 5 mo.		2.17
Total cost of steer at end of 5 months		88.28
Selling price of steer---1225 lbs at $7.25 cwt.		88.81
Profit		$ .53

According to the table, therefore, in order to realize ten per cent profit on the original investment, which is no more than a just profit for the risk incurred, the 1225 lb. beef should bring $94.78, or $7.73 per cwt., a margin between markets of $1.23 per cwt.

But, you ask, "What are the remedies for the present condition?" Beef is high already. When we must figure on a $7.75 market for our finished product to make a legitimate profit, we are figuring on an average market that we have never seen for pulp fed cattle. In other words then, we must buy our feeders cheaper. Local feeding conditions should be improved. Foremost among these needed improvements is increased silo capacity at the sugar factory. The way it is now, practically all strictly pulp fed cattle must be marketed during a period of about sixty days, regardless of market or weather conditions, or the finish of the cattle themselves. With increased silo capacity, the marketing period would be extended for sixty days longer. It would give the feeder a better opportunity to utilize his cheaper feed in the way of beet tops and pasture. He could consequently make a longer and cheaper feed by feeding less of a concentrated feed in order to hasten the finish before the pulp is gone.

If the silo capacity cannot be increased, and it seems improbable with the unsettled conditions that it will be, it means that the feeder in order to have pulp later in the season must silo some pulp during the campaign so as to have it available for feeding when the pulp at the factory is finished. This, however, is rather an expensive operation with the present price of pulp, and a reduction in price from 75c to 50c during the campaign would make a

difference of about $1.40 per head in the foregoing table. On the other hand an increased silo capacity with dry, cured pulp and its attendant benefits and the lengthened feeding period, might produce results whose value it would be difficult to thoroughly appreciate without having tried it. Let us hope that conditions may right themselves so that stock feeding, which plays such an important part in our community's welfare will become once more a business, instead of, as some one has termed it, "a disease."

Belgian Sugar Crop

The editor of the Belgian sugar journal, Sucrerie Belge, F. Sachs, contributes to the current issue of the International Sugar Journal what is apparently the first authentic information regarding the sugar crop of Belgium during the past season. Contrary to the widely published reports of the destruction of sugar factories in the territory occupied by the Germans and the almost total loss of the beets grown last year, M. Sachs asserts that the owners of Belgian sugar factories received the co-operation of the German civil administration in harvesting and working up the beet supply. According to his estimate the sugar output for the season was in excess of 150,000 tons which, although approximately 100,000 tons below the average yield of the past few years, is sufficient for the normal needs of the Belgian population. In his report M. Sachs says in part:

Sixty sugar factories and fourteen raperies have been able to work this campaign in Belgium. Only nine factories, mostly of but small dimensions, have been unable to work. No Belgian sugar factory has been destroyed save perhaps that of Warneton, situated near to Ypres, and of which I have no recent news.

The total sugar production of Belgium this year will certainly exceed 150,000 tons. It will thus be considerably higher than the consumption in normal times. This is certainly a commendable achievement in the face of all the difficulties which have been encountered.

Duties of an Agricultural Superintendant of a Beet Sugar Factory

H. C. Geise, Agriculturist Ft. Morgan Factory

An agricultural superintendent should be a man that understands agriculture in all its phases. This, of course, is the primary requirement. However, a thorough knowledge of practical farming is not in itself enough to make a man a successful agriculturist. He should also be a shrewd business man, for practically all of the buying of the raw material is in his charge, and without sufficient quantity of raw material, in this case sound beets, factory superintendent, master, mechanic, chemists, etc., would be more or less handicapped, for they could not produce sugar at a minimum cost unless they had enough beets to run a factory at its maximum capacity. It will be seen, therefore, that the production of a maximum quantity of granulated sugar at a minimum cost is made possible to a great extent through the good results obtained by the agricultural department.

In order for the agricultural superintendent to be a thorough success he must have the full confidence of his farmers, and in order to secure this confidence, he must make beet growing profitable to the farmer; first, by getting him the best price possible for his beets, and, second, by being able to advise him what land is best for the growing of beets and also a system of crop rotation that will, in the course of years, result in increased crops and increased revenue from his farm. He should also be a practical stock man, for there is no farm that can be made a success without feeding stock in order that all roughness produced on the farm may be put back into the soil in the form of manure for fertilizer. He should also be able to advise the farmer what breed of stock will be best adapted to his particular requirements, and be able

to recommend a balanced ration which will make stock growing an economical success.

It is not enough to merely understand the growing of beets. He should know the relative values of the different soils and how to handle them; what particular crop will be the best to grow; how best to prepare the seed bed and how to cultivate the crop; what time to plant; what is the best method of irrigation and time of application when a shortage of water exists; how to combat and overcome the multitude of pests that endanger the crops; and, finally, how to harvest the crop successfully and economically.

Hand labor, especially in beet growing, is quite an important factor, and the securing of laborers is almost entirely up to the agricultural staff. They must encourage the locating of sufficient laborers in the district to take care of the needs of all the beet growers and then see that the farmers fulfil their duty by paying the laborers for the work done. It is also necessary to encourage these laborers of today to become interested in the growing of beets so that they will be the farmers of tomorrow, for in this way the number of beet growers is gradually increased with a resultant increased acreage. If a farmer has a large enough family to do most of the work on his farm without the introduction of outside labor the results will of course be more profitable than if he has to hire labor.

An agricultural superintendent must have the confidence of the bankers in his district, for it is on his opinion that they often have to depend in making loans to farmers. For instance, if Bill Jones wants to mortgage his crop before it is harvested and the banker does not know whether or not it would be safe to advance him the money, he will often inquire of the agricultural superintendent. If, in his opinion, Bill Jones is likely to harvest a good crop, the banker will probably make the loan, provided the opinion and integrity of the agricultural superintendent are known to be sound. It will be seen, therefore, how important it is for him to be thoroughly acquainted with his farmers and to have the entire confidence of the bankers.

It is necessary to impress upon the farmres the importance of delivering their beets at the receiving stations in a sound condition for unsound beets will not keep and, consequently, deterioration will take place. The fresher the beets are when introduced at the factory the more sugar will be extracted, and the gain to both the sugar company and the farmer will be in proportion to the amount of sugar extracted, for the sugar company has to take into account the sugar loss between beets bought and beets sliced in making its price to the farmer. When the loss is great the farmer receives less for his beets. The same applies even more so in the case of piled beets. The farmers must also be made to realize that when beets are being placed in piles at the receiving stations these piles should be made as high as possible, for the higher the pile is made the less space is subjected to the action of the sun and air and the evaporation area is reduced to a minimum. Unsound beets will not keep in the piles for any length of time and in order to overcome deterioration in the piles the beets must be put in sound. The principle governing the accounting the sugar company must take to cover the loss in sugar on account of deterioration of beets is the same as that governing the amount of premium to pay on insurance. When the risk is great the premium is large, and vice versa. So when the loss to the sugar company between beets purchased and beets introduced at the factory is reduced to the minimum the sugar company will be able and willing to pay a higher price to its farmers for the reason that they will be making more money.

An agriculturist should be a practical irrigation man. He should be thoroughly familiar with the water conditions of his different irrigation districts so that he will know the acre feet of water available as well as the amount of late water that may be expected, so that he will be able to advise intelligently what per cent of each crop ought to be grown in order to get the greatest amount of good from the water that is available. (In districts where there is an abundance of water this is not so important). In cases of shortage of water it is his duty to aid the farmer in his negotiations for more water.

He is also the buffer between laborer and farmer and the farmer and the company, and it requires almost the qualifications of a diplomat to smooth out some of the differences that arise. At interviews with his superior officers he must represent the farmers cause' and get as many concessions as he can, for the more he can get for the farmer the easier and pleasanter will be his relations with him and the more business will he be able to do with him. He must be absolutely fair in all his dealings with the farmer and give him the benefit of any doubt, so far as weights, per cent tare, per cent sugar, etc., are concerned, and at the same time be honest with his company.

He should be a student of political questions insofar as they affect the farmer and factory. He must study these questions and present them to his constituents in such a manner that the importance of the issues involved will be appreciated, and so that they may know that the outcome is dependent upon their votes and influence. It is only in this way that the beet industry and the farmer can be protected, by proper legislation.

It is well also to cultivate the business men of his community and acquaint them with the fair and businesslike methods of his company. It is necessary to give the local business men as much patronage as possible in the way of repairs and improvements at the receiving stations when they can do the work as thoroughly and cheaply as it can be done by outsiders. This not only helps to build up the community but keeps good feeling between the factory and the community.

The agricultural superintendent ought to take an active interest in local affairs and help to make the community in which he resides as pleasant and modern as possible at the lowest possible expense to the people. It would be well for him to be in a position to help plan modern farm homes and advise how modern conveniences may best be installed at a low figure. If one farmer has an up-to-date and attractive farm home it will be an incentive for his neighbor to go him one better and more people will be attracted back to the farm away from the cities where they make just a bare living. The farmer is the man of the hour. Everybody is looking to him to reduce the high

cost of living by producing more food stuffs. People can only be kept on the farm when farming is made profitable and where modern conveniences are available.

An agricultural superintendent must have the utmost confidence in the fairness of his company, for no man can make a success of his work unless he feels right in his own heart that the cause he represents is benefiting his community and helping to solve the problems that his neighbors are interested in to the extent that every man, woman and child in the community will be bettered in his conditions through the company's business connections in that locality. The employees of the Great Western Sugar company do feel that the cause they represent is just such a cause as this, and the high inspiration of their resolve has been acquired by coming in contact with the officers of this company whose methods of fairness are never questioned in the minds of their employees, and the inspiration we get from these officers is what has brought about the efficient working organization that we have today in the various departments.

The results obtained by factories, farmers, and residents of these sections where we have sugar factories have worked to the mutual benefit of all concerned, both directly and indirectly, as well as the entire State of Colorado and the Nation.

Caring for the Farm Machinery

J. A. Reid in "Farm Engineering"

A generation ago it was a common sight along country roads in the winter time to see practically all the farmers' plows, harrows, and in fact, nearly all the machinery used in cultivating the land, setting in the fields with no other covering than that provided by the elements---a few inches of snow. The old way was undoubtedly a handy one. It was a simple matter to take the horses out in the field in

the spring and connect up with the plow or harrow and start operations. But the rusty plow would groan and screech and the horses would pull like blazes on the traces. About a day or so later when a plow handle, rotted by the winter's exposure to the elements, snapped off, the burst of profanity from the hired man could be heard for half a mile. This was surely a deplorable state of affairs, and no modern farmer worthy of the name can afford to follow this method.

Every piece of machinery on the farm represents an investment of capital. Whether the investment will pay good dividends or not depends on how long the machinery will give satisfactory service. Every day that particular piece of machinery is left standing in the field it depreciates in value and part of the farmer's capital is lost. The farmer should see that he has sufficient weather-proof shelter to accommodate all his farm implements and machinery, and every implement should be put under shelter at the end of each day's work. This will require only a few minutes' time and those few minutes will be well spent.

Besides providing the necessary shelter for his machinery, the farmer should see that all machinery gets needed repairs promptly. It is bad management to let a damaged or broken part stay on a machine simply because the machine will still work. Some day that part is bound to play out, and as likely as not will tie up your work for several days until a new part can be procured.

Oil will do more to make your machinery light running and to remove and prevent rust than anything else, and despite the fact that John D. makes most of it, oil is comparatively cheap. See that your machinery gets the benefit of this cheapness. A dollar will buy enough oil for your machinery to run it nearly a whole year. Use it liberally. The business farmer does not take risks with his farm machinery. He sees that the proper shelter is provided for every piece of machinery on the farm and he keeps his machinery in repair. Are you a business farmer?

Marketing Our Roughage

W. L. McCaslin

As we near the close of the feeding season, it is apparent that the cattle feeders, at least, are not going to make any profit out of their operations. Some of them who are still in the game hope to "save their bacon" by holding on, their theory being that the market must improve, as it cannot get any worse. While this argument is plausible, we must remember that industrial conditions in the manufacturing districts of the east are very bad, that there are some quarantined districts yet that are anxiously waiting that will ship out practically everything at once that has been on feed when released, and then muddy feed lots in some sections are causing a great many half-fat cattle to be cashed, so when the expected raise comes, it wlil perhaps be at a time when the feeders of Northern Colorado have few fat cattle to sell.

After the favorable winter we have had and the comparatively cheap feed, and the good gains cattle have made, it is reasonable for the feeder to expect better returns for his labor, and the risk he has taken in the venture, but it is easy now to see that the feeder paid too much last fall for his feeders. One feeder very aptly remarked that he made money feeding his cattle, but that he lost one dollar per hundred when he bought.

Thinking back over the last few years, it is my observation that it has been the grower and not the feeder of either cattle or sheep who has made the money. The feeder buys at a time of the year when nearly all other feeders are wanting to buy, consequently the demand is great. A large part of the feeders sell at about the same time in the spring, when the supply is great, and he again comes in competition with the feeders as he did in the fall.

The law of supply and demand, of course, governs, but in both cases works against our feeders. But what are we going to do to obviate this condition? Grow our own

feeders? No, that is not practicable on our high-priced lands. Even if the breeding stock was available, it would take several years before the increase would be old enough to feed, so growing our own feeders is out of the question.

In a recent issue of "Through the Leaves," I suggested Dairying as a profitable means of marketing our roughage and keeping up the fertility of our soils. I think to this should be added hog raising, as the two go well together. It requires only a small investment to get a start in hogs. The increase from eight or ten good sows should be marketed each year, a car load of fat hogs that would cost the grower very little cash outlay.

Nothing, compared with the cost of a car of feeder lambs or steers, the hogs could be pastured during the summer months on alfalfa, and with a little grain added, a good growth made at a minimum cost. After the sugar beets are dug in the fall, hogs thrive on the field, utilizing the missed beets that would otherwise go to waste.

Denmark is famous for its breakfast bacon, most of which is exported to England, produced largely from feeding barley. We can grow more bushels of barley per acre here than the corn states can grow bushels of corn, the feeding value of the two grains being about equal.

Cut alfalfa and syrup also makes a good cheap fattening ration, well liked by hogs and could be fed with cracked or ground barley to a good advantage. Now why not make our Western country famous for its Sweet Pork? We have the cheap raw material necessary and the energy and brains with which to carry out the enterprise; moreover, if our farmers would devote a part of their alfalfa to pasture instead of putting it up for hay, they would not have such strong competition when selling their hay.

I realize that there is that "bugaboo" cholera, but it has been demonstrated that this can be as successfully prevented by vaccination in hogs as can small pox, or typhoid fever in the human race.

Now is a propitious time to start growing hogs. The foundation stock can be had reasonable. Do not start

with too many. Do not expect the hog to do without shelter in the summer, as his hair is thin. He also requires a good warm place in the winter and clean water to drink both summer and winter. Good sanitary conditions will in a large measure prevent cholera. Why not give the mortgage lifter a trial?

Livestock Market Letter

Ben Kemper, Pres. Denver Livestock Com. Co.

Written for "Through the Leaves"

Receipts of cattle for the month of March have been rather liberal in Denver. Our demand has been fair and sufficient to take care of the receipts. The condition of the foot and mouth disease east has shown some improvement, but not as much as we had anticipated. This, coupled with the worst conditions in the feed yards in Kansas, Nebraska, Missouri and Iowa that we have had in 20 years and the high price of corn, ranging from 65c to 75c, has discouraged feeders, and the liquidation of cattle has continued, and it is my opinion will continue until the feed yards improve and the grass has started, so that the feeders can get rid of the heavy expense of carrying these cattle. We have been hoping and still see brighter prospects by the 15th of April, and where a man can carry his cattle at a minimum cost, we believe it is advisable to do so, as conditions are not normal, and would advise holding until we have normal conditions.

Good fat steers selling here from $7.00 to $7.35. Medium kinds from $6.70 to $6.85. Good fat cows from $6.00 to $6.35. Fair cows from $5.50 to $5.80. Good stock cows in strong demand, also stock steers and feeding steers

The shipments from Colorado in the last three weeks have been quite heavy, mostly on account of the shortage of pulp. There still remains about the usual number of cattle.

The Cow

Rae H. Kiteley

Mr. Wirt Wright, president of the National Stock Yards Bank, writing for "The Financier," indulges in the following panegyric of "our time-tried friend, the cow":

"The cow is an unprepossessing individual, which we have known casually all our lives. She has furnished a large portion of our sustenance since we were a year old, if not from birth. She has helped to clothe us. Her disposition is irreproachable unless she happens to be male in sex, and then doubtless only in character with most males. While alive she gives from three to ten times her weight annually in milk, she and her progeny fertilize our soil, she bears a calf annually---if a female, to follow her excellent example, if a male, worth eighteen to thirty dollars as a yearling steer, thirty to fifty dollars as a two-year-old and sixty to one hundred and fifty dollars as a fat aged steer.

"And when she is deceased? Verily a day might be taken to tell of all the things derived from her revered remains."

Our feeders, who are now balancing accounts for the season, are possibly somewhat short in reverence toward the kind of remains, left to them from their operations, on their ledgers, for unfortunately there is too much similarity to the results of last year.

Economists agree that to build up a permanent and successful industry of any sort there must be a considerable degree of certainty as to a moderate margin of profit. Possibly great profits imply possible great losses and a speculative foundation is the inevitable result. The minimizing or removal of any uncertainty is the highest service that can be performed for any business.

The cattle feeding game in Northern Colorado is handicapped on the one hand with the possibility of great gain because of our open and dry winters, cheap feed and no need for shelter; on the other hand by the possibility of great loss because of the general fluctuations in prices of beef animals, the necessity of selling at once upon the ex-

haustion of the cheap feed from the by-products of the sugar industry, the fluctuation in prices for other feeds, such as barley, corn and cotton seed, and the seeming necessity of buying costly animals on a high market in competition with one another within a very short period of time.

The comment has been general this spring: "We paid too much for our stuff." Of course a low market at the time of purchase and a high market when our feed is gone would be very nice except for the fact that the opposite is just as apt to occur, as has been the case this season. Unusual conditions, such as the European war and the foot and mouth disease, may be cited always in explanation, but if we would content ourselves with seeking our profits from the gains in weight and quality and apply ourselves to the elimination of uncertainties, whether for or against us, we might make some progress in this industry which is recognized by experts as speculative and hazardous.

Would it not be a good idea for the Sugar company or some one else in a prominent position, to call the feeders together for a conference and comparison of results and experiences. Co-operative instead of competitive efforts surely ought to net us some advantage. Longmont feeders could easily get into touch with those similarly interested in all of Northern Colorado through the Sugar Co., organization or committees of their own appointment from some of their own organizations or meetings. The difficulties in the way of co-operative buying or selling are many, well known and hard to overcome, but the conference and consultation which characterize all our successful industries now-a-days---even farming through its unions, granges, institutes, short courses, congresses, county agriculturists, etc.---might prove of value to the feeders.

While we know that our land is too valuable to permit breeding and raising any considerable portion of the stock we can feed every winter, still we must admit that the limit of our capacity in that direction is by no means reached, particularly when we have so close at hand the mountain ranges to help us over the crop growing season.

An idea of what needs to be attempted is indicated by the following sentences from another article from "The Financier":

"College and university professors under the direction of James J. Hill will conduct a live stock campaign throughout the Northwest. Howard R. Smith, professor of animal husbandry of the University of Minnesota and author of 'Profitable Stock Feeding,' resigned his chair to direct the work for Mr. Hill and began his duties March 1. Mr. Hill's campaign will last the twelve months of the year and will be exhaustive in character and territory."

Because Beets Pay Better

From "Berthoud Bulletin"

The Ault Advertiser said last week: "Any statement that the Sugar company is paying all that it can afford for beets or that the farmer is making money at his part of the industry has been disproved so often and so conclusively that the main wonder is that any one outside of the Sugar company and its attaches can be found who will repeat it."

Now, we don't know anything about the sugar company's end of the proposition. They may or may not be paying what they can afford to pay, but in view of the fact that the farmers continue to sign contracts for tens of thousands of acres of beets every year the "main wonder" is that any one will say that beets are not a profitable crop for the farmer. As a matter of fact the editor of this paper has found beets on an average for the past ten years the most profitable crop grown on his farms, and his tenants are always anxious to grow beets. When our farmers find that they cannot grow peas profitably, they just quit growing peas, and if they found that they could grow other crops more profitably than beets they would just quit growing beets. We would all be glad to get more for our beets, but we don't get anywhere in our discussions with the Sugar company by not telling the truth.---Berthoud Bulletin, March 26th.

Six Million Wasted Acres

According to the Department of Commerce approximately $120,000,000 of American money was expended last year for foreign-grown sugar imported into the United States. Of this the lion's share went to Cuba, the total imports from other countries being valued at less than $4,000,000. The Summary of Foreign Commerce gives the figures for the twelve months ending December 31, 1914, as follows, the quantities having been converted from pounds into long tons for the convenience of readers:

	Long Tons	Value
Cuba	2,215,552	$115,517,902
Santo Domingo	9,079	524,225
South America	19,559	1,400,649
Other Countries	17,581	1,774,277
	2,261,771	$119,217,053

The Government report includes also 155,473 long tons of sugar from the Philippines, valued at $7,802,241, which is omitted from the above table, as it is actually the product of American soil.

Sugar also figured among the exports of the United States during 1914 to the extent of 14,334 long tons, valued at $772,198. Deducting these exports from the figures given above leaves 2,247,434 long tons, valued at the ports of entry at $118,444,855, as the net imports for the year.

These dry figures contain material for some interesting and instructive comparisons.

Exports of wheat from the United States in 1914 amounted to 173,861,944 bushels, with a total valuation of $187,184,100, an average price of $1.07 a bushel. This was the highest price at which the export wheat crop had been sold for ten years. Even with this unusually high price of wheat, however, over 63 per cent of the whole amount exported, or 110,696,126 bushels, was required to pay for the imported sugar bought from foreign growers and dealers. To grow the wheat that went to settle this sugar bill it was necessary to till 7,806,500 acres at the

average yield of the past ten years. This is nearly one-eighth of the normal wheat acreage of the entire country and represents an area almost equal to the combined total of the improved land in the three large Western states of Montana, Wyoming and Utah. Practically all the wheat grown in the four great agricultural states of Minnesota, Wisconsin, Illinois and Iowa was required to foot the nation's bill for foreign-grown sugar.

If it were impossible to grow sugar in the United States it would be excusable to use this large proportion of our wheat crop to pay for sugar imports. As statistics published by the Department of Agriculture show, however, there are no less than 278,000,000 acres in the country adapted to sugar growing, and all the sugar imported into the United States last year could have been grown on approximately 1,800,000 acres of our own land. Bulletin 260 of the Department of Agriculture gives a list of nineteen states adapted to sugar beet growing, and adds:

"If one farmer in four in these states were to plant a 3-acre patch and give it the care that could readily be bestowed upon so small a plat, it would be unnecessary for us to buy foreign sugar. Two-thirds of 1 per cent of the improved land in this area is all that would be required to accomplish this result. More than that acreage lies idle, absolutely unusuel, every year. Any one of the states of Illinois, Iowa, Kansas, Missouri, Minnesota, Nebraska, or Ohio could produce all this sugar and then have the beets occur only once in a 10-year rotation; several of the others could do it alone on a 5-year rotation."

As a result of the purchase of sugar supplies from foreign countries and the export of wheat to pay for it the soil of the United States is being drained of valuable elements of fertility. In consequence the land becomes steadily less productive unless the elements of which it is robbed are replaced at heavy cost. As a matter of actual practice among the majority of American wheat growers no consistent effort is made to prevent this progressive soil exhaustion.

The relative effect of wheat and sugar upon the land is shown by the fact that an acre of wheat takes forty pounds

of nitrogen from the soil, while an acre of beets takes thirty pounds. In the case of beets, however, none of the nitrogen is contained in the sugar itself. It is all in the pulp and tops, which, as by-products of sugar extraction, are fed to stock and so returned to the soil. In exporting wheat, on the other hand, the precious nitrogen goes with it and is lost to the nation.

The net result of the uneconomic policy of the United States in failing to grow its entire sugar supply and in paying for the imported portion in exported wheat involved a loss to the country in the single year of 1914 of approximately 100,000 tons of nitrogen. Sugar itself is made up of carbon, hydrogen and oxygen. It may best be described as crystallized sunshine stored in the beet or cane plants by nature and extracted by man. In importing sugar, therefore, we are buying foreign sunshine. In sending abroad American-grown wheat to balance the account we are selling the very lifeblood of the soil. The ruinous ultimate result of this policy upon the agricultural resources of the country is obvious.

The following is taken from the Scottsbluff Star-Herald of March 18th:

"In 1909 the sugar company offered to locate a factory in Scottsbluff if 10,000 acres of beets could be secured for the 1910 crop. A number of the business men used all the influence they had to induce the farmers to raise the beets but it was impossible to secure the amount desired. About 6800 acres represented the crop for 1910. Since then the business men have taken no active part in securing acreage. In 1911 10,000 acres were harvested, in 1912, 15,642 acres, in 1913, 19,051 acres were signed up in less than a week, and no soliciting was done by the field men, it simply being announced to the farmers that the company was prepared to take contracts. In 1914 nearly 21,000 acres were grown. This spring 32,000 acres of beets were signed up in less than a week. Unfortunately this amount more than equals the ability of the factory to handle, and the acreage will be cut down to 28,000 acres, as we understand it."

Some Legal Points

It is not a safe practice to rent land under a verbal lease. A written agreement should always be executed, showing the terms of the lease, the description of the land rented, what each party is to do and furnish, and particularly setting forth when the lease is to begin and end. Each year a new contract should be signed. The most fertile source of dispute over renting of land comes when a tenant holds over under a former agreement. In case of a year to year tenancy the law requires a written notice of three months prior to the termination of the lease to be served in a specified manner. Often with a holdover lease expiring, say January 1st, the parties may be of the opinion for a long while after October 1st, previous, that their farming arrangements will be continued. Then, along in November some difficulty arises between them and the landlord wants the tenant off his farm. He can not get his wish unless the tenant is willing, and the latter can remain where he is for another year. If a lease is made out each year, stating a time certain when it expires, no such notice is required.

You may have had trouble some years on account of the fact that your beet check included the names of other parties, with whom you could not readily come to a settlement, or because of the interest of one of the parties having been tied up under a garnishee. Then you no doubt became annoyed at the Sugar company because it did not issue you a separate check. If you would put yourself in the company's place and look at the situation from its viewpoint, you would appreciate its position. All that it wants when it buys a crop of beets is to see that the proper parties, and all who have a claim or lien on the crop, receive what is due them. Were it to try to determine what is coming to each and pay separately, its task would be overwhelming, and it might and surely would

make mistakes, in which event it would be under the liability of having to pay twice for the same beets. It is for this reason that the Sugar company includes all the names in the checks and leaves the parties to their own adjustment of the proceeds. When they cannot agree, the company is willing and endeavors to assist them settle the controversy, and in this it is usually successful. However, where an agreement is impossible, on the suit of any party, the company will pay the money into court to leave to it the decision of the matter.

In cases of garnishment, the law provides that the garnishee may pay the money also into court, for the determination of the respective rights of the debtor and others who have claims upon the money. Sometimes a land owner is thus innocently compelled to wait for his share of the beet proceeds until the court has rendered its decision, and here again the Sugar company's position is misconstrued, but there is no more fault on the company's part than on the owner's. As a matter of fact every time the company is garnisheed, it is at an expense of answering the process, and in paying its attorneys to assist those who are not parties to the garnishment action in having the moneys released that are due to them.

So far as we know the appellate courts of Colorado have not determined whether or not a chattel mortgage is valid on a crop not planted when the mortgage is given. The opinion of the writer, based upon what he considers careful investigation, is that such a mortgage becomes good as soon as the crop is planted.

In taking a chattel mortgage on a crop from one who is not the owner of the land, care should be exercised to ascertain just what the interest of the mortgagor is. If he is what is known as a "cropper," working under an agreement to farm and cultivate the land, and not a lessee, he can not execute a mortgage that will be binding against the owner, without, of course, the latter gives consent.

Barnyard Manure

Geo. Knutson

Barnyard manure is one of the oldest and most complete fertilizers used. Yet there is no fertilizer so uniformly wasted as is this valuable by-product from our stock.

In this section of the country where very little of the stock is stall fed, it is quite a problem to secure very much of the manure unless extreme precautions are used to prevent waste.

Wherever possible straw or litter should be kept in the paddock or feeding pen to take up the urine and other liquids. The solid manure from full grown animals contains only the insoluable phosphoric acid, potash and nitrogen, while the urine contains all of the soluable material of the above, only a small amount of these compounds contained in the food entering into the building up of the body. This is especially true when fattening stock are kept as they use carbohydrates or fattening materials very largely. In feeding a full grown animal it is possible to return to the soil nearly all of the phosphoric acid, potash and nitrogen; and the fertility of the soil could be maintained for an almost unlimited time except that some is lost through natural leaching and weathering agents in the field. The fertility found in the urine is in the most available form and generally ready for the immediate consumption by the plants while that in the solid excrements must pass through several intermediate steps before the plant can use it.

The manure should be taken onto the land as soon as possible to avoid ammonification and decomposition. When hauling manure to the field never put it into heaps, but spread it immediately. Any standard manure spreader will do the work very satisfactory if properly handled.

When it is not practical to haul the manure to the fields and there is a considerable quantity of foul seed in it, it may be well to pile it into large ricks so the seed will lose its power to germinate. The rick should be covered with

old tin, straw or other worn out material so as to prevent leaching. The manure can also be applied as a top dressing to alfalfa sod with very good results. Manure will not lose any of its value no matter how dry it becomes if it is kept dry, but if it is permitted to get moist it may cause burning and great loss. In this section where there is a premium on the water in the soil the manure should be applied as green as possible and plowed under at once.

The location of the pen has a great deal to do with the amount of manure lost or saved. If one wants to save the manure the pen should not be located on a side hill where the drainage is good. Get onto as level a place as possible and keep the moisture taken up by the use of straw or litter. The cattle will do better under such conditions and will work the straw into a good manure free of charge. Straw should be used freely as our soil is lacking in material to hold moisture because the ground is not frozen for any length of time and hence there is a constant rotting going on.

Remember that irrigation is most effective where there is something to hold the moisture. Straw has the power of taking up two or three times its own weight of water. This is very important aside from its manurial value in the fact that it has physical effects on the soil such as aerating, mellowing, giving food to bacteria and relieving the tendency to bake and crust.

It is interesting to know what the losses are which are caused by allowing the manure to lie in the pens until it is fully broken down. The analysis of barnyard manure shows that it contains the following according to Hall*.

Composition of Barnyard Manure

	Water	Nitrogen	Phosphoric acid	Potash
1. Fresh long straw	66.17	0.544	0.318	0.673
2. No. 1 after rotting	75.40	0.597	0.454	0.491
3. Very old and short	53.14	0.800	0.630	0.670
4. Fresh French Data	75.0	0.39	0.18	0.45
5. Rotten "	75.0	0.50	0.26	0.53
6. Very old "	79.0	0.58	0.30	0.50
7. Rothamsted average	76.0	0.64	0.23	0.32

8. Fresh liquid manure	98.02	0.044	0.051	0.355
9. Old liquid manure	99.13	0.026	0.014	0.22

*A. D. Hall, director of the Rothamsted Experiment Station, England.

From the above data it will be seen that the composition of rotted manure is a great deal higher than that of fresh manure, yet when one stops to think that about 50% of the total manurial value is lost during the first year when exposed to weathering and leaching, it far offsets the value that rotted manure has and it should be an incentive to correct our methods of handling the barnyard manure.

Summing the whole:

1. Straw should be used freely to take up the liquid portion in the paddocks and pens.

2. Liquid manure is the complement of the solid manure and should be saved and used.

3. Manure should be applied as soon as possible after it is made.

4. It should be spread over the land and plowed under as soon as practical or applied as top dressing to alfalfa sod.

5. Manure becomes more concentrated when rotted but the total plant food is greatly reduced by allowing it to rot.

6. Every land owner should have all possible manure applied each year to keep up the fertility and to insure continued good crops.

7. Manure areates, mellows, makes a home for bacteria, holds moisture, relieves baking and warms the soil.

THROUGH THE LEAVES

MAY, 1915

USE
SUGAR
GROWN &
MADE IN
USA

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Agricultural Notes

W. P. Hogarty

The greater part of our planting is completed and our beet seed never went into the ground in better shape. The seed beds were unusually well prepared and our farmers are beginning to appreciate the value of fall plowing. In a few instances the seed was planted too deep, and this trouble is usually found where the drill was equipped with new shoes which penetrated the soil deeper than the worn ones. Cultivation and thinning will soon be under way. The mistake most frequently made in the first cultivation is not working the soil sufficiently deep to have enough loose soil or mulch to prevent the soil underneath from baking. You have often noticed, when you were cultivating the second time after a shallow cultivation that the ground was so hard a bull tongue would hardly penetrate it, and you will find by deep cultivation in the first operation that this will not be the case. Now, so many of our growers cultivate shallow while the beets are small, so that the least amount of earth will be thrown on the small plants, which is injurious to their growth, but Mr. Maier, foreman of our Company farm, has no trouble in this respect. Where the land is not trashy he places a duck foot on the crooked irrigation shank and by going three to four inches in depth does not heave as much of the soil as with shallower cultivation, then with trashy soil the disks and bull tongue should work well. Each case, however, is an individual one, and you should be careful to get your cultivator to working right before you get well started.

We have found cases of men drilling beets this spring where they said they were planting beet seed 1½ in. deep

and upon investigation one-half of the seed was being deposited on top of the ground, the farmer had not investigated to see where the seed was going, he was just drilling beets. Another case the farmer was working a Deere drill and had the press wheels working loose in the regulation slot with the result that he was planting seed from the top of the ground to 2½ inches deep. There is no excuse in this late day for such work, and you will never get anywhere in the game if you do not overcome that careless way. Your hired men are all right, but they do not have the interest in the crop that you do, and you should give the matters of seeding, cultivation and thinning your personal attention. If you will investigate, and want to admit, you can very frequently trace the cause of a ten-ton crop back to your own negligence.

The thinning will be started before the next issue of this paper, and it is an opportune time to say a few words on how to treat the labor and what to expect of them. In the first place the labor, regardless of nationality, is human, and as a laborer who worked for me once said, "Oh yes, you are good to your labor, you spend $2500 for a house for your horses and $100 for a house for your beet workers," and there is some truth in this statement, and some growers do not do as well as that. Now industrial conditions throughout the country are not good with the result that you can get all the labor you want for $18.00 per acre, and if you had cared to, you could have had it for much less, because there is nothing else for them to do, but if conditions were better you would undoubtedly have to have paid $20.00 per acre. There are growers who have the same labor year after year, and others who have two or three families every year, the former says, "I have a good family and they do good work," while the other says, "I cannot get them to do anything for me." The basis of having a good neighbor is being a good neighbor and while humanity is inclined to be unappreciative to a degree, I believe we all respond to good treatment. We find it is so in dealing with you, and I think you do in dealing with your labor. Treat him as you would like to be treated. Make him as comfortable as your means

and equipment will permit. Get him his coal and supplies without cost of delivery, and above all things, see that he has reasonably good water for domestic purposes, and a little garden spot won't hurt. Then in return show that labor what is expected of him and see that he does it to the letter. Dock him for sloppy work, do anything to him, **if you have first done your part.** Remember good work by the laborer is dependent upon the good work done by the cultivator, and you will receive our support in ridding the country of labor that will not respond under this treatment.

+ + + +

We have 19,500 acres of beets contracted for this season. In former years where the maximum acreage has been grown, the average tonnage has been generally lower than years with smaller acreage. There are various reasons for this; first, you have not been as careful in your land selections and second, with the increase in work you have not been able to do the work as promptly as with smaller acreage. Then too, the irrigation water is often not adequate for the increased acreage. But this is a bully good spring, never better, and let's get a good tonnage and swamp the factory. I would like to see some beets rot on our hands if the cause is from over production.

+ + + +

We wish to call your attention to the circular letter mailed you recently on the subject of surveying and mapping your beet acreage, at the price of 15 cents per acre. Some of you may say that this is another way the company has of causing an increased cost in the production of the crop, but it is not so intended. Tape line measurements are far from accurate, and very unsatisfactory, and when you get through you haven't anything, and is the cause of so much dissatisfaction and controversies between growers and labor, and we believe everybody will be ahead under the plan outlined. We think the labor should stand their part of the expense, the tenant his, and I would imagine the landlord would appreciate a map of his different fields to the extent that he would want to

help in the cost of the survey. Mr. Richardson, the engineer, will have to keep at least two draftsmen busy in the office for three months, figuring up the work of the fieldmen, and making maps, together with himself and three fieldmen for that length of time. Any of you who have thrown our circular letter in the waste basket had better dig it up and read it over again. This is not compulsory on any one, and you who do your own hand work may not think it worth the expenditure, but wherever contract labor is employed it should be a decided advantage.

+ + + +

Cattle feeders are not making money, and it is to be regretted. I do not think any of us realize the importance of the feeding industry to the general community, the direct and indirect benefit. When you see the enormous amount of fertilizer going on the ground this spring, caused from last year's feeding operations, the market for hay that would otherwise be of little or no value, I am led to believe that the paramount industry of Northern Colorado is in the feeding of live stock. The success of every industry is so dependent upon the fertility of the soil. The farmer could not grow alfalfa without something to feed it to, some market, and without the alfalfa we would soon be out of the running for maximum crops. I think whenever the Sugar company does anything to help the feeder it is a step forward, and the most important one for the continuance of the industry.

+ + + +

We think a great deal of the friendship of our county commissioner and his road gang, but we must say that their organization for good roads is rotten and the poorest of any part of Northern Colorado that we have seen. Put that road gang out on a grading job and they are all right, but when it comes to smoothing up roads they had better go into Commissioner Greenwood's district and learn how. I hope to have cause for a more favorable comment in our next issue.

Appearance a Strong Factor in Farm Values

Hugh Scilley, Manager Loveland Factory

Northern Colorado is believed by all of us living here, and by numerous others who do not live here, to be as good a farming country as lies east of the Rocky Mountains, and the results we obtain in crops and what we receive for them will bear out our statements, so that this is no idle boast; but people from the East coming here for the first time, and knowing something about the crops we have produced and do produce, are immediately unfavorably impressed with the appearance of the average farm improvements. They compare them with the improvements on land less valuable in Eastern states, and those of us who have been there know very well that we suffer by comparison.

There is one element that cuts a large figure in the lack of better improvements on the farm, and that is the fact that so many land owners do not live on the land and are depending largely on the rent of the land paying their living expenses in town, so that when the farm supports both tenant and landlord there is not much left for improvements.

Another factor is that the country is rather new yet, and most of the farmers have been paying off the indebtedness on their purchase price, and have been living as economically as possible in order to get out of debt, which is, of course, very commendable. We have, however, got to a point where we can all "see daylight," and have no fear of not winning out; and we should seriously consider the question of making a better appearance. We have the Lincoln Highway, and so many other attractions to bring people to the state, that we should make it a point to try to impress them now we have them here. How we can best do this will have to be worked out by each individual farmer and land owner, and all others can do is to make suggestions for their consideration,

something like the following:

Give your farm an attractive name, and have it painted in attractive letters on an archway over the main entrance from the road. Pay particular attention to having a nice fence around your farm front. If your fence posts are wood, use some whitewash on them or a little cheap, white paint, and keep the weeds trimmed along the fence.

Keep the farm buildings painted, and in laying them out when constructing new buildings, have a system in placing them, so as to present the best appearance possible.

Lay out and seed a lawn in front of the house, with arrangements to water it from a tank or the irrigation ditch the latter being preferable, having enough space for your wife's flower beds inside the enclosure.

Plant shade trees around the house and yards, so that the family as well as the stock can have the advantage of them during the heat of the day.

In unhitching from a wagon or tool of any kind that you have no shed room for, do not unhitch and leave it in the middle of the yards, but back them up in straight lines against the fence. It gives a bad impression to find a rolling coulter laying in one part of the yard, a pile of cultivator shovels in another and a plow lay and pair of doubletrees, etc., in front of the back gate, besides it is bad for the tools.

The idea I am anxious to convey is that we should have a system in trying to add to the appearance of the farm, just as we have in the cropping of it, and if it is carried out faithfully and with reasonable good taste, you will soon find that it has a strong cash value.

Meteorological Report

For March	1915	1914
Maximum temperature	66	72
Minimum temperature	10	0
Monthly mean	33.17	38.60
Normal	-2.71	+2.72
Precipitation	1.16	1.19
Normal	+.09	+.24

"Cane Sugar" and "Beet Sugar"

S. J. Osborn, Chemist Great Western Sugar Co.

The terms "cane sugar" and "beet sugar" are perhaps familiar to everyone although the significance is not always clearly understood. By many it is believed that they represent different substances or chemical compounds, or superior qualities of some kind are often associated in the popular mind with "cane sugar."

In the first place it should be stated that "cane sugar" and "beet sugar" are exactly the same chemical compound, which the chemist expresses by the formula $C_{12}H_{22}O_{11}$. The term "cane sugar" or "sucrose," is often used to distinguish this sugar from other similar but different "sugars" such as "milk sugar," "malt sugar," etc. Any refined "cane" or "beet" sugar is practically 100% pure, that is, it will show 99.8 to 100.0% sugar in the polariscope, which is the most accurate instrument available for testing sugar.

It is then evident that if "cane sugar" and "beet sugar" both represent a single chemical compound of a high degree of purity, they must be equally suitable for all ordinary purposes, that is, they must have exactly the same sweetening power, be of exactly the same nutritive value, be equally suitable for making preserves, etc., etc.

The beet sugar factories of the United States manufacture white sugar directly from the beet. The refineries purchase raw sugar practically all from foreign countries and "refine" this into white sugar. The raw sugar which they buy is mostly raw cane sugar from semi-tropical countries, but they at times purchase large amounts of raw beet sugar which is similarly refined and put upon the market as "cane sugar." It is therefore obvious that the expressions "cane sugar" and "beet sugar" lose much of their force

in this connection. In one case white sugar of high purity is obtained directly from the beet and known as **"beet sugar;"** in the other case raw sugar which has previously been obtained generally from the sugar-cane, but **frequently from the sugar beet,** is "refined," or worked up into white sugar of high purity, which is known to the trade as **"cane sugar."**

The beet sugar industry in the United States is a comparatively new one, and has developed greatly only within the last fifteen or twenty years. During the early years of the industry a great deal of inferior sugar, due to faulty methods of manufacture, was put upon the market, and it is undoubtedly this circumstance to which is due some of the popular prejudice against "beet sugar." Thus it was customary in those days to add bluing to mask the yellow tinge of sugar of poor quality. While this was undoubtedly harmless from a dietetic standpoint, it was of course an attempt to conceal inferiority, and the housewife naturally objected to the formation of a blue scum on the surface of a syrup which she had prepared from beet sugar. Since then methods of manufacture have greatly improved, and we now produce a white sugar of high purity which needs no bluing to conceal any inferiority. I may add that the Great Western Sugar company has used no bluing of any kind since 1907.

The question is frequently asked whether there is any simple test by which "beet sugar" and "cane sugar" may be distinguished. As each is the same sugar of high purity, the difference could obviously be sought only in the small amount, one-tenth of one per cent or less, of impurities. This amount is so small that it may be said there is no test known to the chemist which would determine with certainty whether the sugar was of beet or cane origin.

We frequently run across what might be called amusing methods of differentiation. Thus some Colorado housewives prefer a fine grained sugar, and call a fine grained sugar "cane sugar," and a coarse sugar "beet sugar." The size of the grain is in the first place regulat-

ed by the sugar boiler, and secondly sugar of varying degrees of fineness can be obtained by the use of screens of suitable size. Fine or coarse sugar can thus be obtained at will and with equal readiness in the beet sugar factory, the cane sugar factory, or the refinery. The size of the grain is no more characteristic of "beet" or "cane" sugar than the size of a building stone is characteristic of the quarry from which it came.

Then we also hear frequently that cane sugar is superior to beet sugar for making preserves, that jelly made with beet sugar does not "jell." The sugar in this case plays the part of a sweetening and a preservative. The vital thing in the making of jelly is the presence of a sufficient amount of a substance of rather uncertain composition known chemically as "pectin," which gelatinizes on cooling and forms the jelly. The pectin comes from the fruit, and the important point here is the choice of suitable fruit, and the avoidance of over-ripe fruit, in which the amount of pectin is diminished or at any rate loses its power of gelatinization. To combat this popular prejudice we have frequently given exhibitions of jelly and preserve making with beet sugar at food shows and the like, and it is almost needless to say that beet sugar requires no special handling and gives a product that is as pleasing to the eye and the taste, and keeps as well as articles made with cane sugar.

Agricultural Notes

From "Dry Farming and Rural Homes"

Good farming will pay for an automobile before the other kind has cleared enough to pay for setting the tires on the old buggy.

There will be a number of days this month when the fields will be too wet for working. These are the days

when the roads are in just the best condition for dragging.

Have a vegetable garden for the benefit of the home table, and grow in it a little of everything that can be grown in your locality. Try some things that you have never grown before.

What is there unreasonable about letting every ambitious farm boy have an acre of good land to farm exactly as he pleases? Let him spend a little extra time and money on it. He will be learning all the while and developing the habits of study and concentration, the lack of which is responsible for most of the failures in the world.

The farmer who makes only his living is said to be losing money, because he is not making a percentage on his investment or getting good wages for his time. Nevertheless a man may toil away in the city day in and day out and at the end of the year find he is not anything ahead of the game, yet he is never spoken of as failing to make his living. Isn't there a little inconsistency here?

C. S. Harrison, a Nebraskan, writes: "What a tremendous money making establishment is our splendid agricultural college, with its experiment station. Suppose you graduate 200 well equipped young men worth $20,000 each, each year. They would be turning out four million dollars each year. Every young man who goes out from the institution, carries the multiplication table with him, and he increases his efficiency all the time."

Approximately 6,000 agricultural potato distilleries are in operation in the German empire. The manufacture of alcohol for technical purposes, not for human consumption, is regarded as a necessary factor in general farming. The distilleries provide a market for Germany's potato crop, which is enormous; and the spent mash is returned to the farmers and used for feed for cattle, which in turn enrich the land and thus enhance productivity.

Cut Worms

Asa C. Maxson

Several complaints have come to this office regarding cut-worms in fall and spring wheat. An investigation of some of these reveals the fact that the common alfalfa cut worm is very plentiful in some fields which were broken out of alfalfa last fall.

The alfalfa cut-worm is the caterpillar of a common moth, or miller, which comes into our houses in early summer in great numbers in the evening and flies about the lights. These insects get so numerous at times that kerosene lamps are put out by them getting into the chimneys. When these moths are flying they will be found under garments which are hung upon the walls, and especially if on the outside of buildings, where they go to spend the day. Many times they will be found in the trees in such numbers that if a club is thrown into one the moths will fly out in clouds. The moths are about an inch and a quarter across the spread wings, brownish in color with markings of various shades of brown and grey. A prominent light, almost white, stripe is to be found on the front border of the fore wing. In some cases this stripe is light brown, but lighter than other parts of the wing.

It is thought that there are two broods of moths each year, but this is not definitely known. The spring brood of moths are most numerous during late May and early June at which time hundreds of them will be collected upon the windows of dwellings and out buildings near badly infected fields.

The eggs are in all probability deposited upon some green growth in the fields during late summer. The caterpillars hatch in a short time and become partly grown before cold weather forces them into hibernation. When warm weather comes in the spring they begin to feed upon whatever suitable plant happens to be near them. Feeding takes place just below the surface of the ground and is noticeable through the wilting of the plant attacked. When such wilted plants are pulled up they are

found to be without a root since they have been severed from it by the worm. If wilted plants are found to be attached to the root and no part of the plant is eaten away some other causes must be sought.

As already stated, these worms are to be found in most cases in fields plowed out of alfalfa. This crop appears to be the favorite food. In such fields they will be found about the alfalfa plants, which have not been killed by the plowing, and buried an inch or so in the soil.

Damage to grain sown on such fields is not uncommon. If beets are to be planted the planting should be put off as long as possible to insure against the necessity of replanting. Our knowledge of the life of this pest teaches us that the worms feed until about May 1st to May 15th. Probably the greater part of the worms will have turned to pupae by the first of May. Since in this form they do not feed, no further damage will be done after this change in form takes place. This is the reason for late planting.

In case of loss of small grain replanting to some crop as oats or barley after thoroughly working the surface will in nearly every case give a good crop if not too late for planting of such crop.

There is another species of cut-worm which has done great damage to both grain and beets in this territory in past years. It is very essential that the farmer be able to distinguish between these worms because of the difference in the habits of the two.

The alfalfa cut-worm is dark to light brown with some lighter brown markings along each side of the back. When full grown it is about 1¼ inches long and the size of a small lead pencil. The other worm and which is most apt to be found in fields having grown grain the previous year, is a light olive green color throughout, or in some instances rather a grey green. Along the back there is always a darker line of varying thickness. If watched closely this dark line will be seen to pulsate like a heart.

If this last described form of worm is in your fields do not replant without plowing deeply and thoroughly working the soil. Experience has shown that this is the only safe method. Disking, harrowing and rolling are of no avail in controlling this pest..

These worms will be found to continue their attacks

upon crops until about the middle of July. For this reason replanting, unless the ground be plowed and thoroughly worked, will result in loss of the seed used in replanting. There may be cases where plowing will fail but if done well should give good results in most cases.

The use of poisoned baits has been reported as giving good results in freeing fields of cut worms. Green alfalfa, sprayed with Paris green and spread over the fields in the evening has proved sufficient to rid it of the worms, but it is doubtful if this method is practical if the field is large.

If a field is near the buildings the farm poultry will do good service if allowed to range over the infested field.

In case that you have a field which is infested, a card to the Great Western Sugar Co. at Longmont will reach the writer who will be glad to visit you and determine which form of worm you have and advise you, as best he can, as to the best way to handle the field.

A few years ago one of our growers lost three plantings of various crops on one field. If we had known what we do now and had had the opportunity to advise this grower we could have saved him at least two of the replants.

Wrong Figuring

Not long since, in conversation with a prosperous farmer, he told us that the past year had not been a very prosperous one for him. After figuring up all expenses he said he was only about $500 ahead, which left him with just about a hired man's wages as manager of the property. He thought that was not enough and we agreed with him. But on inquiry we found that he had spent for machinery, fencing, tiling and buildings, about $2,000. All these items should have been charged to permanent improvements and added to the capital invested and not reckoned as running expenses.

He had just so much more invested in the farm, all of which the farm had earned as a surplus. He had it in property if not in clean cash, but it must have been in clean cash at some time during the year, else he could not have spent it that way.

We saw his face brighten up as we talked and then he

said: "I wish that when I was young I had made a good study of keeping accounts. If I had, I would have seen that I was ahead of the game all that I put into these permanent improvements." It looks simple enough when you see it, but we have known merchants as well as farmers do some wrong figuring.

We think the mistake comes through a lack of clear definition in the mind. If a farmer increases his property holding, by adding to the value of the farm, he has increased his wealth, either in the selling value of the farm or by increasing its ability to bring additional revenue. A farmer buys a valuable bull and secures from him a lot of heifers that can earn, say, 30 to 50 per cent more in milk than their mothers. In addition, they inherit from their sire valuable qualities which, when they are bred to another good sire, bring still better cows. All this dates back to the original investment in the first sire as a permanent improvement, an increase in the working capital of the farm. And yet we have seen farmers who looked upon such an outlay as so much money spent for nothing.

Our friend, in his wish that he had studied bookkeeping, was right, for that study would have shown him how to define property and where to place it; how to correctly estimate it. To have the right thought about farm matters is the first step towards doing the right thing. We ought all of us to be more willing to lend money to the old farm for its improvement in money earning power. In doing so we add to our wealth just as certainly, and indeed more so than as if we deposited the same money in a bank or bought a mortgage with it. Money is well invested that increases the efficiency of the farm as a business proposition.

A farmer once saw us spreading phosphate on an alfalfa field. "How long do you have to wait before you get anything back from that stuff?" he asked. "Well, in two or three years," was our reply. "That's too long for me," was his answer. Then we asked him how long he had to wait for returns when he planted an apple tree, raised a colt or calf? "Oh, that's another thing," he remarked. Yes, it was another thing, another place to exercise the same old faith which says: "Except ye sow, ye shall not reap."

How Nature Prepares For Spring

Edward Paschall in "Iron Age Farm and Garden News"

The rush and haste and hurry of spring work, when a score of things sometimes demand attention at once, can be avoided by imitating Nature.

Nature never hurries. The secret of her achievement is that she never halts. Springtime is merely one of her several annual culminations. Well-devised and long-pursued plans have produced their due results. It is like a play on the stage. The actors have been rehearsing for months and know their parts well. The curtain rises on a performance that is perfect in every detail. The scenery is fresh each season though the plot is as old as the hills.

Nature begins her Spring work just about twelve months in advance. No sooner are this year's leaves open than next year's buds begin to form. By August the auxiliary buds of the apple tree mature and may be transferred by human agency to another tree. Leaf buds and fruit buds are alike formed and finished before the close of Summer. Witch hazel opens its yellow flowers in October and November and perfects its seeds late the following Summer.

Underground work is completed before the advent of Winter. All the bulbs, corms, tubers, rootstocks and suckers are developed and made ready for quick action when Spring comes striding northward at the rate of thirteen miles a day.

The so-called weeds and wild flowers sow their seeds in Autumn. The freezing of Winter does not injure them. Indeed, the seeds of certain plants require freezing before they will germinate. Nature scatters the smaller seeds gently on the ground to be covered with sand or loam by the action of rain, snow or wind. The larger seeds must be placed deeper in the soil and the work devolves upon squirrels, mice and birds. Human beings copying Nature's methods, have adopted the following rule,---Plant seeds about four times their own diameter in the soil.

In Winter the trees, shrubs and herbs appear to be asleep but in reality they are more or less awake and active, at least part of the time. The sap of trees begins to flow freely in February and March with the increase of daylight.

Nature does a vast amount of effective manure spreading in Autumn when she coats every field and forest with decaying organic matter including leaves, dead grass and the stems of weeds. The rain and snow compost this material and convert it into plant food.

In addition to this annual supply of organic plant food, there is a considerable amount of inorganic fertility separated each year from the rock particles of the soil. Nature employs frost and ice to lift, pinch, expand and tear apart the upper layer of the earth thus affecting the soil to a depth of five or more inches. After the ground is pulverised as though stirred by harrow teeth. No small amounts of lime, potash and phosphoric acid, called mineral fertilizers) are thus set free and made available. Freezing and thawing produce both mechanical and chemical results just as Summer cultivation of the soil produces results of two sorts.

At the close of Winter with long days and warm rains, Nature is ready with her moving pictures. Her land has been fertilized, cultivated, seeded and rested and everything set in order. Results are certain to be quick and spectacular. How can humanity compete with such conditions? There is going to be a sudden release of energy on a world-wide scale. How can the farmer hope to keep step with the rapid march of events?

The answer is simple. It is only needful to imitate Nature---that is, to be prepared. The secret is in beginning long in advance---a year if need be. To work for tomorrow as well as for today, is called cumulative action; it gains force as it proceeds. Some people call it taking time by the forelock. A well-broken horse can be led by the forelock or tuft of hair growing above the forehead. Time, to be led by the forelock, must be under control. Thorough cultivation of the soil is cumulative in its effects because the process benefits more than one crop. Nature's work is conspicuously cumulative, for she is ever making plans

for the morrow. She hoards her resources and lives within her income.

Operations in field and garden can be hastened and valuable Spring days saved by observing Nature's methods of preparing and applying plant food not only in Autumn but in all seasons of the year. Immediate destruction of waste material is the rule. The old becomes the new. Death is at once followed by Life.

Nobody has yet found a better place to store the natural manures than on the surface of the garden, lawn or field. Some farmers follow the system of immediate disposal during the entire year, never permitting heaps to accumulate at the stables. When the ground is covered with snow, they set up stakes to mark the area that has been top-dressed. People who oppose this plan, speak of a loss of fertility by leaching when the ground is frozen, but those who practice it say that the waste is trifling as compared to any known method of storage and that the results are highly satisfactory.

It will be observed also (and this is not a stretch of the imagination), that Nature sharpens her tools during the so-called rest months of Winter. There is a keen, cutting edge on the frost and ice and even on the air and the sunshine of early Spring, though soft, is still suggestive of cold. Men's sharp tools make for haste and speed. Nature's sharp tools prevent hurry and check progress that would otherwise be too rapid.

Nature's working plans have not changed one iota in a thousand years. Her master word is preparedness. Good farmers are those who are prepared. Preparedness enables workers to keep pace with their work and to push things instead of being pushed by things. This Spring, therefore, is the time to get started on next Spring's work.

Remember Nature's sequences: Plans made long in advance; continuous and cumulative work; entire preparedness without haste or hurry. It is not argued that a farmer's Spring work can be done in advance of the season's arrival, but only that it can be so planned and executed that there will be no need for worry or waste of energy.

Wheat Prices in the Last Twenty-Five Years

H. Mendelson

The following table gives the yearly range of No. 2 cash wheat at Chicago (World Almanac, Edition 1915, page 251):

Year	Months of Lowest Price	Yearly Range of Prices.			Months of Highest Price
1890	February	74¼	@	1.08¼	August
1891	July	85	@	1.16	April
1892	October	69⅛	@	.91¾	February
1893	July	54⅜	@	.88	April
1894	September	50	@	.65¼	April
1895	January	48¾	@	.85⅜	May
1896	June	53⅝	@	.94⅜	November
1897	April	64⅛	@	1.09	December
1898	October	62	@	1.85	May*
1899	December	64	@	.79½	May
1900	January	61½	@	.87½	June
1901	July	63⅛	@	.79½	December
1902	October	67½	@	.95	September
1903	March	70¼	@	.93	September
1904	January	81¼	@	1.22	October
1905	August	77⅞	@	1.24	February
1906	Aug.-Sept.	69⅛	@	.94¾	April
1907	January	71	@	1.05¼	October
1908	July	84½	@	1.11	May
1909	August	99¼	@	1.60	June
1910	November	89½	@	1.27½	February
1911	April	83¼	@	1.01	January
1912	January	93⅜	@	1.20	May
1913	July-Aug.	84	@	1.15⅜	January
1914	July	77¾	@	1.23½	September

*The Leiter "corner" figure.

The number of times maximum prices were obtained in each month during the last 25 years was:

Month	Maximum	Minimum
January	2	5
February	3	1
March	0	1
April	3	2
May	5	0
June	2	1
July	1	6
August	1	3
September	3	1
October	2	3
Nevember	1	1
December	2	1

The maximum price was never obtained in March; the minimum price never in May. The maximum price was oftener obtained in May than in any other month, but only 5 times in twenty-five years. It was oftener obtained in the quarter, April-June than in any other quarter; namely, 10 times. In each of the other quarters it was obtained 5 times. Minimum prices were oftener in July than in any other month, namely 6 times, although nearly as often in January, namely, 5 times. They were oftener obtained in the quarter, July-September, than in any other quarter, namely, 10 times, with the January-March quarter next with 7 times.

If we want to use this table for speculating in wheat we will conclude---Never sell in March and never buy in May. You are most often right if you sell in May and buy in July or January. But at best this is only a 5 to 1 shot.

Most of our farmers will sell during August and September. It will be seen that minimum prices during the last 25 years were reached only 4 times; maximum prices also 4 times. Maximum prices were reached in September as often as in February and April. Minimum prices

were obtained oftener in January than in August and September together.

When, therefore, the future movement of wheat prices cannot be clearly foreseen, selling in September seems to be as advantageous as anything except holding for May delivery.

However---there is a story running in the Saturday Evening Post---"Ruggles of Red Gap"---wherein an unsophisticated English nobleman is introduced to the American game of poker. After seeing the first game he tells his confidant and valet, "It's beastly simple. One has only to know when to bluff." After the first game he took part in, he says, "Studied it out myself, and jolly well right I was, too, as far as I went. But there's farther to go in the silly game. I hadn't observed that to play it greatly one must also know when one's opponent is bluffing; I'd enormously have liked to know it before we played. Things would have been so awfully different."

This is as good a philosophy of speculating on wheat prices, or a pair of deuces, as any.

Hogs---Alfalfa---Molasses

H. Mendelson

Results of the various methods of feeding, no matter how sound the theory is, on which the methods are based, vary considerably under the ever-differing local conditions. In any case the successful feeder must observe his animals daily and make changes immediately whenever the animals do not do as well as they ought to.

Hogs cannot be finished in the shortest possible time on alfalfa, or alfalfa pasture, with or without molasses, unless some grain is used..

In any case the amount of grain needed to make 100 pounds of pork can be essentially decreased by the use of some molasses. As alfalfa and molasses are at present the cheapest food as well as the most available, the hogs should obtain their main sustenance in this form.

Young pigs up to six weeks old are best fed through the mother. If the sows run on green alfalfa pasture the flow of milk is generally sufficient. If, as usual, they farrow before the alfalfa is green they should be fed some grain. This at present prices can be partly replaced by a mixture of three parts bran and one part molasses. However, no molasses should be given until about three weeks after farrowing.

It should be realized that any surplus food given the sow during this time benefits the pigs by an increased flow of milk. Of course, it should be avoided to give so much that the sows put on fat.

On good alfalfa pasture it should not be necessary to feed pigs before they are six weeks old. From then on they should be fed regularly. How much additional food should be given depends entirely on circumstances. The main considerations are when the pigs are to be marketed and the relative prices of grain and pork.

If grain and sugar beets are raised on the farm, the grain and beet top pasture are a very cheap and valuable food and should be utilized by the hogs if the cheapest gains are desired. Pigs six weeks old should weigh about 20 pounds. If they are kept on alfalfa pasture during May-August, inclusively, they should then weigh about 50 pounds, a gain of 30 pounds in 120 days, or about 0.25 pounds per day. By the use of 60 lb grain, or equivalent, during this period the gain should be about 50 pounds. By the use of 300 lbs. grain the gain should be about 95 pounds. This would make the weight of the pigs by September 1st---

with alfalfa alone	50 pounds.
with 60 lbs. of grain	70 pounds
with 300 lbs. of grain	115 pounds

The grain and beet top pasture during September and October should make a gain of at least 30 pounds.

Then the intensive feeding will have to begin, unless the weather is extraordinarily favorable.

During this period at least one pound per head per day must be gained if sufficient food is given.

The pigs should not be marketed under normal conditions unless they weigh 200 pounds.

Therefore this period should last—

for alfalfa pastured hogs	120 days
for alfalfa plus 60 lbs. grain	100 days
For alfalfa plus 300 lbs. grain	55 days

At the very conservative estimate of 400 lbs. grain equivalent with alfalfa per 100 lbs. gain, there would be used during this period—

for alfalfa pastured hogs	480 lbs. grain equivalent
for alfalfa plus 60 lbs. grain	400 lbs. grain equivalent
for alfalfa plus 300 lbs. grain	220 lbs. grain equivalent

or a total amount of grain during the life of the hog of 480, 460, 520 lbs. In other words, the hogs with the largest amount of grain would use 40 lbs. of grain more than the alfalfa pastured hogs, but could be marketed 65 days earlier.

Suppose the finished hogs are worth $12 apiece, then the loss of interest at 1% per month would mean about 24 cents per hog, which is less than the additional cost of grain. The hogs with the maximum grain rate could be marketed under the outlined system after Christmas; the lot with alfalfa pasture alone about the first of March.

A study of prevailing market conditions is necessary to decide where the advantages are.

With high grain and low pork prices it seems advisable to follow the plan of moderate grain feeding during the alfalfa pasture.

Molasses with Alfalfa Pasture.

The best use of the molasses can be made only if fed with grain or bran.

It is possible to use the molasses in troughs undiluted. This is the cheapest method, but the most wasteful. The barrel with molasses should be placed on a rack so that the molasses can flow directly in the trough. The trough must be long enough to allow 6 in. length per pig. It should be filled once a day. The feeding pen in the alfalfa pasture should be constructed so that only the small pigs have access to the trough. The access to the pen should be barred while the trough is being filled. The trough should have only a few inches molasses in it. If more is given, the pigs smear molasses all over their faces. In this form young pigs will eat as much as one pound

per day, without making a commensurate gain, as undoubtedly part of the molasses does not get into the stomach. It is, however, better than feeding without grain.

The better plan is to feed chopped grain, mixing it with molasses at the rate of 3 to 1. If given at the rate of 0.5 lb. per day this mixture has the same effect as pure grain. It is possible that this mixture could be cheapened by using partly bran and shorts instead of grain. The feeding effect of whole grain as compared with ground grain is about 5 to 4. If chopping machinery is available the alfalfa hay chop can also be mixed with molasses. It makes no difference what cutting is used. It is important, however, that the hay for hogs is cut before the alfalfa blooms, preferably from fields with a thick stand. It must be windrowed with the side delivery rake as soon as possible after cutting and must be put up not too dry. All this in order to obtain the minimum amount of stems with the maximum amount of leaves. Hay of this kind will be eaten without waste, while coarse stems induce the hogs to chew it and spit it out. There is no harm done if the hay turns brown in the stack, provided it does not mould.

About 25% of the weight of the alfalfa can be added in the form of molasses.

If the hay is put up in good order nothing is gained by grinding it fine. If the hay is too coarse the hogs may eat it, but simply load their bowels with ballast. Even good alfalfa is only 65% digestible. The hogs' digestive apparatus is not like ruminants, arranged for taking care of such roughage. Only its cheapness per unit of digestible makes it possible to use it for hog feeding.

The mixing of chopped grain and bran with molasses is done as easily as mixing concrete. It is necessary to have the molasses hot. The maximum amount of molasses which can be incorporated in such material is about 30% of its weight. If more is used the mixture is too sticky.

If such foods are kept for any length of time, or if molasses is kept around the farm in open tanks, it is necessary to make sure that the molasses has an alkaline reaction; otherwise fermentation sets in during the summer. The sugar factory furnishing the molasses can undoubted-

ly give this information. If the molasses is not alkaline, about ½ lb. quicklime should be slaked in 3 pints of water and mixed with 50 gallons of molasses. It is very probable that most hogs in our farming districts do not get lime and minerals enough during the winter. Hogs should have access all the time to a pile of ashes or slack coal.

It is not safe to give hogs for any length of time more than 10 lbs. molasses per day per 1000 lbs. live weight. Without close supervision they will often eat considerably more than that without harm and there is no objection to it, but they must be watched closely. If they begin to scour or lose their appetite the daily allowance must be immediately decreased.

The fattening value of molasses as compared with corn or grain depends on the quantity fed. In small quantities it has the same value due to its appetizing tonic qualities. In large quantities it has about 62% of the corn, about 82% of California feeding barley, about 75% of brewing barley and 70% of wheat.

Therefore if corn costs $1.50 per 100 lbs. f. o. b. Longmont, molasses is worth $.93 or $18.60 per ton. Sugar beets, which are also a very good hog feed, have a fattening value of about 20% of corn. 100 lbs. sugar beets, therefore, are worth 30c per 100 lbs., or $6.00 per ton on the basis of $1.50 per 100 lbs. corn.

It should be kept in mind, however, that in no case is it possible to replace grain entirely either by molasses or sugar beets; only part of the grain can be replaced.

The following seems a rational method of managing hogs on a farm where alfalfa grain and sugar beets are raised:

The alfalfa pasture should be divided in two parts. The hogs should always have access to plenty of water. If the water runs in a small ditch, the ditch banks should be well fortified with brush, to prevent the hogs from rooting.

On the dividing line between the two pastures a feeding pen should be arranged. The bottom board should be just high enough to allow the little pigs to go through and not the sows.

It also should be possible to close the entrance entirely during the filling of the troughs. This can be done by having the bottom board about 10 in. from the floor and attaching to it by hinges, another 10 in. board. By means of a hook, and string this board can be easily lifted or dropped.

If the maximum amount of any food is to be given with safety, it is not advisable to use self-feeders. The man in charge must be compelled to look at the hogs every day. Only then can any ill effect of the feeding or the start of cholera be detected in time to prevent harm.

The sows should be placed in the alfalfa pasture as soon as the alfalfa is about 3-4 inches high. Pastures should be changed regularly every week. It is advisable whenever rain and the hogs have puddled the land to go over it with a harrow, or better with an alfalfa cultivator. Otherwise the productivity and the life of the pasture will not be very much.

If the molasses is to be used straight in the troughs and some grain with it, it is best to give the grain in the morning, and the molasses in the afternoon. In the beginning of the molasses feeding very little of it should be given and the rate increased gradually, as long as the pigs show no signs of damage. This method allows the maximum feeding of molasses regardless of the grain fed.

If the grain and molasses are mixed before feeding, an increase in the molasses always means, of course, an increase of the grain at the same time.

Under present conditions of pork and grain prices no more than 60-100 lbs. grain per pig should be fed during the pasturing period.

Mill products like bran or shorts are better fed in the form of a slop or mixed with molasses, as they are so light that the wind or the hogs breathing blows them away. In buying these mill products it should be considered that the fattening value of shorts is about 72% and bran about 65% of that of corn. In other words if corn is worth $1.50 per 100 lbs., shorts are worth about $1.03, and bran about $.975 per 100 lbs.

It is important to make the length of the troughs suf-

ficent for the number of the pigs. The large proportion of runts to be seen on ordinary farms in the fall is largely due to the fact that the smaller pigs are kept from eating by the larger ones.

The size of the alfalfa pasture depends on the quality of it. 100 pigs require from 6 to 10 acres. A well managed alfalfa pasture should produce by September 1st a minimum of 500 lbs. live weight per acre deducting the weight of the pigs when put on pasture. An often advocated plan is to allow so much pasture that crops of hay can be cut. This is very wasteful as far as the alfalfa is concerned as only a low grade hay can be produced, and not much of it, while the cutting and handling of it costs just as much per acre as that of a good field.

After the grain is cut, if desired quite a little can be fed in the sheaf.

All pigs should be turned into the grain and beet pasture as soon as possible. The grain pasture should be utilized before the fall rains germinate the scattered grain. The very minute that the pigs on this pasture appear to get thin they should be put in feeding pens and fattened. It is waste of grain to feed them and allow them so much exercise as pasturing usually involves.

With expensive grain a 200 lb. hog is the most economical.

During the last fattening period it is best to mix grains and molasses, and not feed any molasses during the last two weeks, as the quality of the fat produced with too much molasses is not very good. During this period if one pound molasses per hog is given it is equivalent to one pound of grain; if two pounds are given they are about equivalent to 1.7 lb. At any rate only the actual behavior of the pigs as observed on the spot can indicate how much molasses can be given.

No illusion should be had as to replacing all grain by molasses.

In any case properly put up hay should be kept in the feeding pen in abundance, either chopped and mixed with molasses, or in bulk. Only by this method can the maximum rate of increase be obtained with the economically desirable limitation of the grain ration.

Livestock Market Letter

Ben Kemper, Pres. Denver Livestock Com. Co.

Our cattle receipts for April have not been excessive here. Demand has shown quite a little better and prices on steers show forty to fifty cents a hundred advance. Cows from fifty to sixty-five cents advance. Cattle have all shown a very good gain this winter, but the prices that they have been bringing do not show any margin at the present time. The writer was of the opinion that we would see more advance this month, but owing to the heavy receipts at all River markets, as well as at Chicago: it has interfered with much advance. Prospects for the coming month are that these good fat cattle, desirable weights for Denver, will be scarce before the end of the month, and we look for Denver to be paying River prices for these steers by the 15th of May. Cows, they are buying now just as high as at the River.

The demand for stock cows still continues good, as well as for all classes of stock steers.

The Southern season will open about May 10th. We don't look for as many Southerns as last year, and prices will probably range from $1.00 to $2.00 per head higher.

THROUGH THE LEAVES

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Agricultural Notes

W. P. Hogarty

A great many of our growers have sent in their cards authorizing us to have their beet lands surveyed, and Mr. Richardson will begin this work at an early date. This is an experiment we hope will work out, and we believe it is possible in the future to get this work done at a reduced cost.

+ + + +

Much has been said on the subject of thinning of beets, so I will simply add a few words. First, be sure you have cultivated up close to the plant and loosened the ground so that the thinner can pull the beets out without breaking them off, it makes less double plants for the second operation. Second, see that the labor is spacing the beets to the distance that in your mind will give the best results. We advocate 10 to 12 inch spacing, and try to get this result with a 7-inch hoe. In the past we have tried four to five inch hoes, but the labor generally strikes twice with the smaller hoe, and our experience has been that we will save more beets per acre with the larger or seven inch hoe.

+ + + +

We have given you our ideas on cultivation in previous issues, just remember that the beet plants are growing very rapidly, also the weeds, and it is only a short time until you lay the crop by; the work is usually needed before you are ready. We have had an abundance of rain and then some, yet it may be a long dry spell, so let us try and keep the moisture that we have, and this can only be done by a proper cultivation, and plenty of it. As the beets get larger don't work the soil to a depth that will destroy the feeder roots.

+ + + +

Little damage has been done to our beet crop by frost, but we had a narrow escape.

There are about 1200 cattle on feed in our vicinity and it looks as though the few cattle remaining will make a profit.

+ + + +

Crops in general are looking very fine and the country has all the ear marks of a prosperous year.

Mr. X., who is one of our beet growers near Hygiene,

+ + + +

and living a life of single blessedness says, "To love one's neighbor as one's self is an easy proposition, when one is single and she is good looking." I may not be competent to judge, but I thought he was making a pretty good job of it.

+ + + +

The beet crop looks mighty good, yet I believe that fully 75% of our beets were planted deeper than they should have been this spring, and an equal per cent of replanting was from this cause. Our seed beds were not as firm as they should have been, they needed more work.

+ + + +

After publishing this paper for nearly three years, a single copy has gone astray into the hands of my good friend Chas. W. DeVine, of Greeley. Mr. DeVine is a substantial farmer of Weld county and was my neighbor when I lived on the farm. He is the one farmer who dared or is willing to comment on the booklet, and in publishing his letter (without his permission) you will note the effect it had upon him.

"At Home on the old ranch in the La Grange school district, which is 8 miles northwest of Greeley, Colo., the day being Sunday the 16th of May in the year 1915 A. D., and in the reign of Woody the Wonderful, the hour being 8:30 a. m. by the alarm clock, which is a little fast. (N. B. The alarm clock, like some folks, is always a little fast.)

"Will, my boy:---

"As I was devouring my frugal matutinal repast just now, not so long since I was perusing 'Through the Leaves,' the present leading publication of the English speaking people, at present occupying the surface of this planet, finding to my entertainment, edification, gratification, and all other words ending in 'tion,' that you are the

star writer of the leading editorial, and the chief contributor of the beet articles, etc., I feel impelled, nay compelled, to congratulate you upon your entrance upon the literary field, and no less to congratulate the literary field upon your acquisition. William Dean Howells at present Dean of American Letters, but I see no reason why you should not aspire to the succession or during his incumbency, as his incumbency doubtless appears to all aspirants, you might modestly style yourself Dean of American Letters the Second, as Jack London modestly reveals himself in the 'Sea Wolf,' a modern classic, with all emphasis on the 'sick.'

"As yet I have not been able to grasp the full significance of 'Through the Leaves.' Are the leaves all we get out of the beets? Is all the profit, when there is any, from feeding the tops? How about some roots, susceptible of dissection from the leaves to be sold to the factory for some of the ready John Davis to pay our debts with? For, as Artemus Ward truly says, 'In the midst of life we are in debt.' Did he ever farm in Sunny Colorado?

You intimate that the paramount industry of Northern Colorado is the feeding of live stock. In this I fully concur, for while feeding dead with embalming fluid may prove profitable to the undertaker, it is profitable to no one else, but my life long struggle has been the feeding of live stock—the bi-pedal variety. Old Thack said all the efforts of our complex civilization are directed to getting three meals a day upon the table, and I have found it singularly so. (Mr. DeVine lives alone).

"You speak of the germination of beet seed. Our noble president, Woodrow, the Oneth, cautioned us to observe a strict neutrality, and don't you think that in conformity therewith it would be discreet for the present at least, if not for all time, to avoid and evade the mention of any nation whatever, either the Germi Nation or any other, otherwise 'Me and Gott' might construe it as Lese Majeste, and that reminds me that last fall it was given out that 'Me and Gott' were afflicted with throat trouble, although a long-suffering world had noticed no hindrance in the emission of the perpetual flow of hot air. Recently,

however, we have indubitable evidence that 'Me and Gott' have sinking spells.

"A warm friend of yours, (whom you will be able to identify by this information as to his temperature), assured me that you are on the high-road to posterity and prosperity, not always identical, but let us hope so this time.

"I note that Mr. Geese---of Ft. Morgan---whose name is evidently misspelled in 'Through the Leaves' advises the cultivation of business men. A good idea. They surely need it, most of them, not all. I have two letters from a Boston firm that would give some valuable points to the average business men in the art of correct business correspondence, and so with best wishes for your continuous prosperity, and presumably consequent happiness,

"Yours for more roots to the leaves and more price to the roots,

"CHAS. W. DeVINE."

"P. S. You may or may not notice that in writing Superintendent instead of Superintendant, which is the orthography at the head of the Giese article, I adhere to the Websterian orthography instead of following new breaks. Still, your little booklet is a creditable piece of booklet, making which does its producers proud, and it's full of suggestiveness, among other things that of creating an artificial taste in cattle for molasses on their food, and now you have created such a consuming taste for molasses that you cannot satisfy it. Like Oliver Twist, they are asking for more. Now, in the good old time, and all times when old are good, before all these artificial wants were created, we got along just as well or better. Why, me and Adam never heard of maple syrup in them days, and never enjoyed better health in our lives. I tell thee, good Will, that if thou cuttest not out these 'fallals' thou wilt soon have the cattle and even the very sheep, and eke the swine, craving and requiring ham sandwiches, Chili Colorow, hot tamales, quail on toast, strawberry short cake, and, if Germany wins, sauer kraut, pretzels und limburger cheese.

Additional Pulp Silo to be Constructed

N. R. McCreery, Manager

We do not know of any announcement that we could make that would be of more interest to a large number of beet growers than that the construction of an additional pulp silo has been authorized. It is the plan now to construct a new silo with a capacity of 20,000 to 25,000 tons. In addition, a new bulkhead will be built at the south end of the old silo to take the place of the one that went out last winter, and in the rebuilding it is planned to make it higher and stronger and thereby increase the capacity of the old silo. In fact, we estimate that more than two-thirds of our output of pulp can be stored. This should mean a condition that will allow the feeder to feed fewer cattle for a longer period or until such time as he feels that the market warrants. It will do away with the necessity of putting in more cattle in the early feeding season than they can have pulp to finish. It should also do away, to a large extent, with the congestion of teams at the bulkhead, as the period of using pulp will be stretched out considerably, and a much larger proportion loaded off the silo floor and less over the bulkhead, than with the present arrangement.

Meteorological Report

For April	1915	1914
Maximum Temperature	76°	76°
Minimum Temperature	29°	17°
Monthly Mean	51.63	45.90
Normal	+ 3.33	-- 2.40
Predipitation	4.20	2.79
Normal	+ 2.41	+ 1.00

A Field Man's Experience

Lee McMillen

I commenced to work for the Great Western Sugar Company at Loveland on November 22nd., 1903 as foreman feeding cattle---or shoveling noodles---they fed about 1600 steers and 365 head of cows, and finished feeding and marketing them on the 8th of June the following summer. I then took charge of the company farm, looked after the farming in the summer and feeding in the fall, feeding sheep and cattle. I was there three years and then went into the field work and have seen a good many changes in the method of raising beets and receiving them.

The first crop I looked after I made some mistakes and the Sugar Company paid the price, and Mr. Officer (who was manager then) said, "Don't make that one again, but we want you to learn," which would be good advice to some of our growers---always profit by your mistakes by not making them again.

I was a new man and the labor on the farm was wise and they took advantage of my lack of knowledge on blocking and thinning, and cut the beets out too far apart because it was easier to top with the hoe than to pull and top with the knives in the fall. I had one German family who gave me lots of trouble, and I told them they would have to do better or I would fire them, and they said that they knew their business better than I did, and knew more about the beet work than I did or ever would, and I guess they were right for they fixed it so it would be easy for them. So look out for the blocking and thinning and see that it is done right for the field man cannot be there all the time.

I hired a man to cultivate and when I went out to look over his work I found he was cutting out about half of the beets, so I said, "What's the matter, John, can't you cultivate beets without thinning them with the cultivator?" He said, "Yes, but it's too blamed much trouble to change

the cultivator." So you see you have to look after the cultivator too and see that it is adjusted right.

I sent a man to harrow a 30-acre piece of beets to break the crust. I was busy and did not go to the field to see what he was doing. About a week after when I went to look at the beets I found I did not have any, so I asked Bill how he had done the work, and he said he had set the teeth straight and rode the harrow, and when I asked him why he did that he said it was because our neighbor, Dave did the same thing. So you want to watch the work and see that it is done right. Don't harrow your ground or do any other work unless your crop needs it, and don't do it just because your neighbor does it, for the condition of your field may be entirely different from his.

I hired a man to irrigate and sent him to clean out a waste ditch. He worked a day and a half and then came into the barn. I asked him what was the matter, and he said that he was no muskrat, and that the ditch had not been cleaned out for so long that it had all grown up with cattails and rushes and the muskrats had taken possession; so clean your ditches before it costs too much to do it.

When I first started in the business we were pretty particular about letting the horses step on the beets and we thought if the beets were rolled it would kill them. One agriculturist who saw one of the labor step on a plant after it had been thinned said, "Be more careful, do you want to kill all the man's beets?". And he was a good agriculturist, too. So you see we were more careful then than we are now, but really I believe it pays to be careful all the time.

One time I had a good farmer ask me to engage some good labor for him, so I secured the best available and sent them out to him, but they came right back to town. I found that the trouble was he had a beet shack that puts one in mind of the Arkansas Traveler's stable---3 boards on one side and a pile of dirt on the other and no roof. This same farmer lasted about three years, and that beet labor now owns 80 acres of as good land in my district as there is, and does not owe a dollar, and the beet shack he

has for his labor is in good shape and painted. You will realize that he must have been a good worker to accomplish these results and we believe it pays to make things comfortable for the beet labor; it not only helps the looks of your place but you will find you get better work from your help when they are comfortable and satisfied.

I once went out to see a new grower and after I had introduced myself he told me that he knew as much about raising beets as I did, and did not care if I never came near the place again. I assured him that I did not want to boss him that I only desired to work with him to get results, so he said for me to take the roller he was using and he would get another one, and asked me how I liked the way he was rolling his beets. I told him he was doing it wrong as he was covering up a lot of the beets. He contended that he was doing it all right, but he afterwards changed to cross rolling, and before the summer was over he called me often to talk over the crop and I consider him one of my best friends now. We fieldmen do not claim to know it all, but we see all kinds of conditions and different methods of working the crop and are always glad to give you the benefit of our observations.

Some of the beet growers are so late with their replantings that they will be a little behind time with their thinning. The proper time for thinning beets has always been a question open to considerable discussion. After these many years of practical experience in Colorado some have yet to learn that the yield may be enormously increased by knowing which plants to leave and which to remove. This may mean an ultimate increase in the yield of twenty-five per cent. The thing is to leave only the strongest, and to observe regularity in spacing the beets. The subsequent operations of hoeing and the use of cultivators are thus greatly facilitated. Too little importance appears to be attached to this regular spacing. It means labor of course, but is profitable in the long run. The closer the beets the higher their sugar percentage. This necessarily means also comparatively heavy yields.—From Denver Field and Farm.

Is Our Climate Changing?

Asa C. Maxson

Editor "Through the Leaves"

Dear Sir: We constantly hear statements from seemingly intelligent people to the effect that our Colorado climate is getting wetter all the time, the supposed reason being the saturation of the soil from constant irrigation.

Would a statement from your Mr. Maxson, who has access to the records be of interest to your readers?

In reply to the above communication the writer will attempt to give such data as will enable the reader to draw his own conclusions in case that he does not agree with those drawn.

Records of the rain fall at Denver are available as far back as 1870. For convenience of comparison the rain fall is given in five year averages beginning with 1870 and ending with 1914, a period of 45 years or 9 five-year periods.

Period	Average yearly rain for period
1870-74	13.79
1875-79	16.00
1880-84	14.28
1885-89	13.55
1890-94	13.87
1895-99	13.13
1900-04	12.26
1905-09	17.05
1910-14	14.21

The wettest five-year period was from 1905 to 1909, with an annual rain fall of 17.05 inches. The driest was from 1900 to 1904, with only 12.26 inches. Thus it will be seen that both the wettest and driest periods are in the last 15 years. Again the first 15 years of the 45 have a slightly higher average yearly rain fall than the last 15 years. (1st 15 years 14.69 inches. Last 15 years 14.50 inches.)

Now let us consider the wettest and driest years in each 5-year period. The following table gives these::

Period	Greatest Rainfall	Year	Lowest Rainfall	Year
1st.	18.05	1872	11.81	1873
2nd	20.12	1876	10.86	1879
3rd	19.49	1883	9.58	1880
4th	15.95	1885	9.51	1888
5th	21.43	1890	8.48	1893
6th	16.12	1895	9.33	1899
7th	15.29	1900	9.10	1901
8th	22.96	1909	11.83	1907
9th*	18.11	1912	8.56	1911

It will be noticed that the average of the three years with heaviest rainfall during the 1st 15 years is 19.22 inches, and that of the three heaviest years in the last 15 years is 18.78 inches. Likewise when we compare the lowest years in the 1st and last 15 years of the period we find that the 1st gives an average of 10.72 inches as against 9.83 inches for the last.

Now again, if we compare the first 20 years with the last 20 years we find that the first give an average yearly rainfall of about 14.41 inches and the last 20 years an average of 14.16 inches. This is a difference of but 0.25 inches, which we are bound to consider as no difference at all. Therefore we must conclude that the climate is not changing in regards to the amount of rain which falls annually.

There is a theory that the climate goes in cycles of about 35 years, in which case we should expect to find extremes in rainfall, etc., about every 35 years. Whether or not this theory is correct I am unable to say. In this connection the following is of interest: The wettest 5-year periods in the last 45 years were those from 1875 to 1879 and from 1905 to 1909. Between these periods there were 30 years which is 5 years short of the period mentioned above.

During the last 45 years there have been eight years with less than 10 inches rainfall, 1880 with 9.58; 1888 with 9.51; 1890 with 9.33; 1893 with 8.48; 1899 with 9.33; 1901 with 9.10; 1903 with 9.50, and 1911 with 8.56. It will be

noticed that next to the lowest yearly precipitation was in 1911. The lowest yearly rainfall occurred in 1903. From the above it will be seen that the two years with the lowest rainfall came within the last 15 years. Now if we were going to consider the slight difference which the records show we would have to say that the weather was turning toward drier rather than toward wetter on the average.

However, since the period (45 years) is relatively short, we would not be justified in considering these small differences, so again I must say that there seems to be no indication that our climate is changing or that we are getting more rainfall now than 45 years ago.

Good Roads

From "Dry Farming and Rural Homes"

When it takes four horses to pull an empty wagon to town and wheat is going off in price each day; when the mail carrier gives up in despair, and the children cannot get to school, the farmer cannot help wondering how much this condition is costing him each day.

Figure as he may, he cannot get away from the fact that good roads are indispensible to agricultural prosperity.

The city dweller is alike concerned. The farm on a good road has scores of possibilities for the development of its resources to every one open to the farm on a poor road. Increased profits mean increased expenditures—greater buying powers.

In the early days of poverty many a county bonded itself for hundreds of thousands of dollars to secure railroads to promote agricultural development. Three-fourths of all the freight the railroads haul must sooner or later move over the public highways, and every ton so moved is costing at an average rate of 23 cents per mile.

Verily, road improvement is a business proposition---a matter of dollars and cents.

The Beet Webworm

Asa C. Maxson

Before another issue of "Through the Leaves" reaches you you may be obliged to take some measure to prevent the beet web worms from damaging your crop. While there has been at least two articles on this pest published in this booklet it seems wise to call your attention to the matter of being prepared for the first brood as it appears during the last two weeks of June.

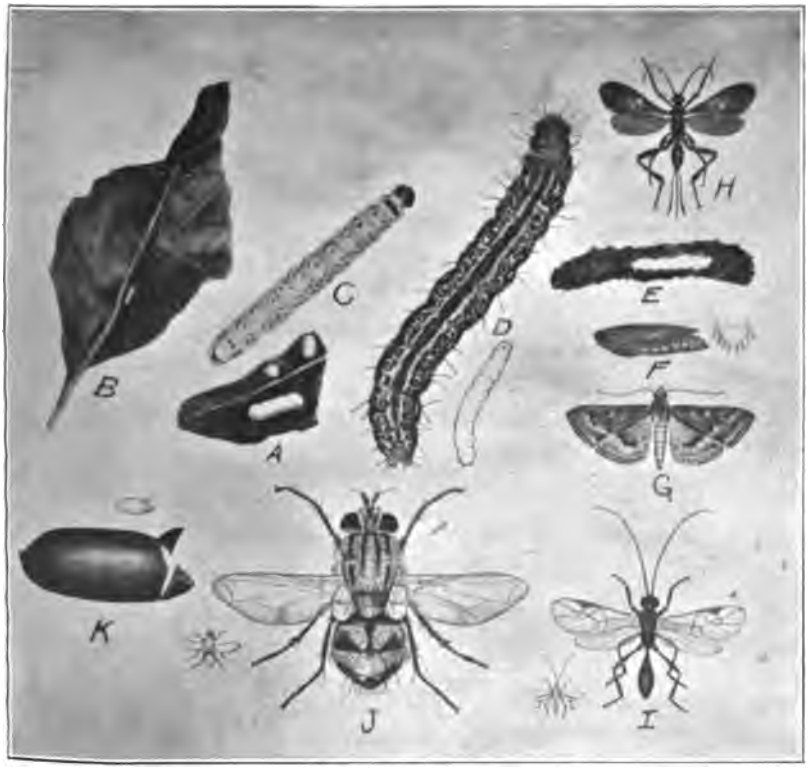
The accompanying cut shows the webworm in its different stages together with some of the insect enemies.

Fig. A represents the eggs. The upper part of the figure showing a single egg and a cluster of three while the lower cluster contains five eggs. The overlapping seen in the cut is characteristic when more than one egg is placed in a place.

In from 3 to 5 days after the eggs are deposited the little worms appear on the under side of the leaves (see Fig. B) as little whitish worms about the size of the one in the cut. At C this worm is shown much enlarged. The full grown worm is shown at D.

When the worms attain their full growth they burrow into the ground and spin a cocoon which is shown at E, with the earth adhering. The white portion shows the white or yellowish cocoon which is made of fine threads of a silky appearance. After a few days, in the case of the first brood of worms, the worm has changed to the pupa which is shown at Fig. H. This stage is the one just before the moth shown at G comes out. The pupa is yellow and when disturbed will squirm about and roll over and over in its cocoon.

Fig. H represents a parasitic insect which destroys many worms. This wasplike insect is a dark red color with black or very dusky wings. The Fig. is about natural size. Fig I represents another parasite which is yellow in color and a little smaller than the figure. Fig. J represents a fly quite similar in general appearance to the



common house fly, but which is a friend to the farmer because of its activity in the destruction of the webworm and other caterpillars. Fig. K is the puparium from which the fly emerges and which is the stage between the fly and the maggot which kills the webworms.

All attempts to control the webworm are apt to result in failure if the following points are not observed: The time when the worms are easiest to control is when they are as shown in Fig. B. The preparations should be made before the eggs hatch and the spraying done as the eggs are hatching. Do not wait until the worms attain full growth or nearly so. Remember that the worms do not feed on the upper side of the leaves for several days after hatching so that their presence may not be known unless careful search is made for the eggs and young worms. Use a power spray and apply not less than 3 pounds of Paris green to the acre. This should be mixed in suffi-

cient water to cover the acre. The amount of water will depend upon the kind of spray and the pressure used. With most types of power sprays, with the nozzles properly set, which means that you are making a very fine fog-like spray, it should not take over 100 gallons of water per acre. You had better fill the tank of the sprayer and run it out. Then measure the ground covered. If you do not get at least three pounds of poison to the acre failure will be apt to follow.

If in doubt what to do either consult your field man or drop a card to the factory at Longmont and the writer will visit you and give you the best advice in his power.

Crops Not Affected by the Moon

From "Weekly News Letter"

Scientists are now convinced that the moon has no more influence on crops than it has on temperature or the amount of rain or the winds or any other weather element. The growth of plants depends upon the amount of food in the soil and in the air that is available for them and upon temperature, light and moisture. The moon obviously does not affect the character of the soil in any way, neither does it affect the composition of the atmosphere. The only remaining way in which it could influence plant growth, therefore, is by its light. Recent experiments, however, show that full daylight is about 600,000 times brighter than full moonlight, yet when a plant gets 1-100th part of normal daylight it thrives little better than in absolute darkness. If 1-100th part of normal day-night is thus too little to stimulate a plant, it seems quite certain that a 600,000th part cannot have any effect at all. It is therefore a mere waste of time to think about the moon in connection with the planting of crops. The moon, says the scientists, has nothing more to do with this than it has with the building of fences, the time for killing hogs or any other of the innumerable things over which it was once supposed to exert a strong influence.

Picture Story of Cuban Cane Sugar Industry

W. D. LIPPITT

1. Cutting sugar cane near Central Tinguaro. Natural cane grows to a height of from 10 to 15 feet and will yield anywhere from 20 to 50 tons per acre.

2. Loading cane into oxcart. These two wheeled carts are huge cumbersome affairs holding two or three tons each and usually drawn by eight head of oxen. The cane stalks are cut close to the ground, stripped of leaves and chopped into pieces about three feet in length. These pieces are then carefully loaded by hand into the carts and hauled to receiving stations or mills.

3. Receiving station near Central Constancia. The cane is hoisted fr the oxcarts by means of the chain sling seen in the picture and dropped i small railway cars for transportation to the mill.

4. Typical homes of Cuban field laborers. The roofs of the h are invariably thatched with palm leaves, the sides being covered with t same material as in Figure 4, or in some cases as in Figure 5, with weath boarding.

5. Typical home of Cuban field laborer.

6. Central Delicias located on the north coast of Cuba in Oriente Province. This is one of the most up-to-date mills in the Island and produces from 100,000,000 to 125,000,000 pounds of sugar in a season. Mills of this type produce sugar at a cost of from 1¼ cents to 1½ cents per pound.

7. Transporting sugar from warehouse to barge and thence to ves in the harbor for shipment to New York. Notice the motive power use switching the cars.

8. Oxcart being loaded with grocery supplies near Central Chapa This type of transportation is common throughout the Island.

Why Not Have Better Dairy Cows?

H. H. Simpson, County Agriculturist

Ismay Belle DeKol, 218028, a Holstein cow owned by Frank Penfield, who lives 11 miles southwest of Longmont, is a good example of what better breeding and care will do for our dairy cattle. The record of this cow for a period of 25 days during the month of April, was as follows:

Total milk for 25 days	1958 pounds
Average milk per day	78⅓ pounds
Average test, butter fat	3.9%
Total butter fat	76.36 pounds
Average butter fat per day	3.54 pounds
Average value butter fat per day, at 30 cts. per cwt. in milk	$1.06
Cost of feed per day	$ .42
Net profit per day	$ .64
Net profit for the 25 days	$16.00

This cow is only four years old, her second calf being

dropped on March 21, of this year. She is a splendid type of Holstein and will undoubtedly make a good showing for herself by the time her present year's record is complete. At present she is receiving the following ration (which, by the way is a good one): corn chop, 6 lbs.; ground oats, 7½ lbs.; ground barley, 3 lbs.; bran 2½ lbs.; oil meal, 1 lb., and all the silage and alfalfa hay she will eat. This makes the grain ration, 20 pounds per day, seem a little large, but she is a big cow and as may be seen, is a very heavy producer.

What Boulder county needs at present is more cows of the type of Ismay Belle, and they can soon be produced by the use of pure bred bulls and the careful culling out of the poor non-profit producing cows. Too many farmers are continuing to milk the same old "brindle" cow that existed before any improvements had taken place. And some have been found who are intending to improve their herds by using pure bred sires, but are making no progress because they jump from one breed to another. One year a Jersey bull is used and not getting satisfactory results, a Holstein or Short Horn is then tried, hoping, I presume, by such crossing to produce a new wonder.

It is high time we stop this experimenting and choose our breed, then by continually getting better sires and culling out we will have cows that will do much more than furnish a means of getting rid of the feed we raise. Every farmer should carefully study the conditions affecting himself individually, and then study the characteristics of the various breeds and decide upon one that best fits those conditions. Breed characteristics, the factors which make one breed different from another, have been developed for the purpose of getting animals that will be most efficient in certain surroundings, and when the blood of different breeds is mixed one is more than likely to lose some of the efficiency of each. True, by such practice, you may get an occasional animal of high merits, but the majority will be of low standard. Such cows as Ismay Belle are not produced by the practice of haphazard crossing.

During the past year I found one man using a Holstein bull on a herd of Short Horns, another using a splendid

Guernsey bull on some good grade Short Horns, and still another using a registered Holstein bull and a fine bunch of Red Polls. Holsteins are not adapted to the conditions of every farmer, neither are Guernseys, Short Horns or Jerseys, and indiscriminate crosses are not adapted to any present system of farming.

It is not necessary to buy registered cows, but a very profitable herd can soon be developed by the use of good grade cows showing characteristics of the desired breed, and a pure-bred bull. We have some very good herds of this kind in the county at present. Mr. Nels Anderson living west of NiWot, has one of the best grade herds of Holsteins in this part of the state which he has developed by careful selection and the use of the best pure-bred bulls he could get. Mr. F. B. Schroeder, also one of our good Holstein breeders, has a grade cow that produced over 9,000 pounds of milk last year.

The excuse is often put forth by the general farmer, that he is only keeping a few cows for his own use, selling only the surplus cream, and he cannot afford to get a registered bull. This man usually has the same excuse when you ask him about the chickens, pigs, or some of the crops that he raises. Of course, if the idea of farming is only to furnish a little stuff for home use, well and good, but the majority of farmers are farming for the money there is in it, and to make the greatest profits, everything on the farm must add a little. We should not be content to keep live stock just to eat up feed, waste scraps, etc., when we could just as well have the kind that would serve the same purpose and besides add a little to the bank account. Every community in this county should have access to good, pure-bred sires and this can easily be brought about by neighbors co-operating on the purchase of them. It is much better not to keep a sire at all, but depend upon a neighbor's registered one, than to keep a scrub. If improvement is sought the sire must be better than the females. In choosing your breed this is one very important item to think about: Are there other breeders of the same kind close enough that you can get service until you are independent of them?

Farm Tractors vs. Horse Power

Jno. Maier

In a recent issue of a Western farming paper appeared a long article on the efficiency and economy of the modern tractor, the writer seemed to be somewhat biased for he refers to the inefficient horse and the efficient tractor

Now we employ both a tractor and about 30 head of mules, and without laying ourselves liable to being called a knocker, we might say we find a great deal of efficiency in our work stock and some inefficiency in our tractor, and we have one of the largest and highest priced machines on the market. The writer also says, taking the figures of good authorities, it coses fifty cents per day or $182.50 annually, to own a draft animal. Now as it happens, we are able to give exact figures of the cost per animal for the last year, which was, including feed, water, light, shoeing, repairs to harness and labor, $102.25. The average number of days each animal worked was 195 during the year, which brings the cost per working day to 52½ cents per head, or less than thirty cents per day for the year. The item of depreciation has not been taken into consideration in those figures, for the value of the colts which can and should be raised will more than offset the depreciation on the older stock.

During the years from 1906 to 1911 inclusive, we plowed our beet land with horses and mules, total number of acres plowed 1976, average cost per acre, $2.06, average yield per acre 14.75 tons. During this time we had two dry seasons, 1908 with a dry spring, and 1911 with a dry spring and summer and a short water supply. During the years 1912 to 1914 inclusive, our plowing was done with a tractor, total number of acres plowed 1141, average cost per acre $4.03, average yield per acre 15.25 tons,

with one, 1912, extra good, and 1913 and 1914 above the average season.

We have also used the tractor for other work, such as discing, leveling, harrowing, hauling beets and fertilizer, with indifferent success, still it is a convenience to own a tractor that can be out plowing when your teams are employed otherwise. The tractor has no doubt come to stay, and will be improved, and also must be reduced in price before a great many farmers will be able to own one. But if any one tries to tell you that by owning a tractor all your troubles will be over and that you are going to double your yield and save a lot of money on the cost of producing your crop, reach for the salt.

Livestock Market Letter

Ben Kemper, Pres. Denver Livestock Com. Co.

Denver, Colo., May 21, 1915

The demand for cattle since our last letter for the "Leaves" has improved very materially, and prices have advanced on all classes of fat cattle, from forty to sixty-five cents. The good, handy weight kinds preferred. Top in Denver today, $8.10. The bulk of the good cattle selling in Denver from $7.75 to $8.00. I also wish to state that the improvement is not only on this market, but at all live stock markets. The demand seems broader, and the vim is once more in the buyers and they want the cattle. We expect to see the good cattle sell very high during the months of June and July. Stockers and feeders have also been in good demand, and all classes of young cattle, including good breeding cows, and we feel very optimistic on the cattle market for the summer, and if we can keep the foot and mouth disease down next fall and winter, we see no reason why all classes of cattle should not command good figures.

Raising Sugar Beets

W. R. McClellan

Not long ago I called on seven of our successful beet growers to ascertain their methods of crop rotation, every one of these men had at some time raised 25 or more tons of sugar beets per acre. Two had exceeded 26 tons and two 27 tons. We took up their methods, every one extra good potato raisers, and all were sheep feeders, and had raised these crops on potato land.

We found, taking out one hail year, and two years when we were short of water, that these men had for ten years averaged 19 tons of beets per acre. What does that mean? It means that were all the beets raised in Northern Colorado put on ground properly prepared and properly tended, that our beets would average at least 16 tons per acre instead of twelve. What would it mean to this state if at nearly the same cost we produced four tons more beets per acre, that sold for $5.75 per ton net as they did in 1914. In five years that would pay most of our debts and put us on easy street. There was a U. S. government expert here last summer who investigated the beet situation very carefully, when he was through he told the editor of our home paper the main trouble with beet growing was that fully one-third of the beets were grown on ground not fit to grow beets and a good deal of it not in shape to grow any paying crop. Years ago Germany, who has raised beets for over 100 years, laid down this rule: To grow beets successfully you must have manure, and either have rowed crop of fall plowing and raised not over two crops of beets in succession. Here too many are growing beets on the same ground year after year with no manure or rotation of crops.

These seven farmers referred to have nearly the same rotation: Three or four years in alfalfa, then a coat of manure, two crops of potatoes, two of beets, two of grain, then alfalfa again. Some change this form. Granted that

these men have good soil, above the average, but I do not believe there is an acre of land now in beets in Northern Colorado but can raise 15 tons of beets if properly handled. If land is light or gravely, the rotation must be shorter and include only one crop of beets in five years, our rotation is two crops in nine years. The other way would be two crops of beets, four of grain, six in alfalfa in twelve years, but all the crops would be paying some profit, while eleven ton beets and grain crop following can't be paying crops.

We must cut out such low average crops to bring our standard up to a paying basis, no man can keep up with such crops. Right here is where the County Agriculturist will get his work in by advising men to put such land into hay for at least three years, and when they break it up have a number of paying crops and re-seed again.

I saw in 1912 two acres of beets at Delta, Colorado, that produced 104 tons 520 lbs. net at the factory that were paid for at near $6.00 per ton, or $300 net for the crop per acre. This was the fifth consecutive crop of beets grown on that two acres. How did he do it? He hauled each winter all the stable manure from town he could plow under. He irrigated early in the spring, as they have worlds of water over there. It was heavy, yellow, clay soil. As soon as it was dry enough he plowed it carefully, taking pains to go ahead of his plow and push the coarse wet manure in the furrow so it was all covered; he harrowed it and floated it, making an ideal firm seed bed, seeded heavy, thinned the beets himself getting a perfect stand, and tended it himself. The wet manure held the moisture, and those beets never stood still one day or one hour, and so grew large, ripened and had high sugar content. So far as I know that beats the record in this state or any other. One acre of such beets is worth a 40 acre tract of 11 ton beets, as far as real profit goes. We cannot all devote the time and care or have the manure to do this, but lots of us do grow 25 tons on 25 or 30 acre tracts, and a whole lot more ought to. Except lice, or worms, or hail, no farmer should allow himself to grow less than 15 tons, and the man who does had better take a vacation for a week, and ride around and see those who are raising

beets at a profit. What we all need is more education along the lines of more intense farming to increase our yields, less howling about prices, and more careful study of the soil and ground preparation to produce maximum yields, and this will no doubt get us farther in the end and do more to increase our bank account.

We must work together in some way to further this industry. We have the ideal soil and climate for sugar beet growing, and we need it in our crop rotation and stock feeding. We must expect some years lice and worms, and in such cases not much profit, but all other crops have just such failures, and it must be expected but beets on good ground are unquestionably one of our safest crops. We must all work to produce the maximum yield at smallest expense, as in any other crop, and even with a year or two of low sugar prices we can hang on until conditions change, so let us put forth our best efforts to make our beets the successful crop.

International Soil Products Exposition

F. W. Taylor

This exposition, to be held in Denver, from September 27th to October 9th, next, is to be of a size and importance that few of us realize now. For the single item of county exhibits from Colorado counties, there are offered cash prizes of One Thousand dollars.

These are divided as follows:

Best exhibit by Colorado county, four prizes of $200, $150, $100 and $50, respectively.

Best exhibit of cereals by Colorado county, $40, $30, $20, $10.

Best exhibit of grasses by Colorado county, $40, $30, $20, $10.

Best exhibit of vegetables by Colorado county, $40, $30, $20, $10.

Best exhibit of minerals by Colorado county, $40, $30, $20, $10.

Best exhibit of fruits by Colorado county, $40, $30, $20, $10.

The Colorado laws permit the Boards of Supervisors to make appropriations for the purpose of making such exhibits and the farmers should, through their organiations, or individually, see that plans are made for these county exhibits. There is a fair show that by securing some of these 24 prizes, a good part if not all of the money appropriated may be returned, and beyond that, it is certain that a fine and well installed exhibit will be worth, in publicity, many times its cost.

One special feature of the exposition will be a field test of the various small tractors which are now being built by many of the implement firms, with which the farmer may do much of his field work. In past years the builders have not realized that what the farmer wants is not a large, heavy, expensive motor, but one that will actually do the work, in an economical way, of a good four-horse team. Such a motor does not eat unless it is at work, and does not have to be curried or exercised, and if it can be supplied at not much greater cost than the horses which it replaces, will be a great boon to the farmer, even if he does not work a large tract of land.

The manufacturers now appreciate these facts, and are doing their best to build such a machine. We will have a chance to see how well they have succeeded, at this demonstration.

There will be many other features of great interest and benefit to the farmer.

It is always inspiring and helpful to see what others in the same line of business are doing, and the farmer is a business man, in the best sense of the word.

Nothing approaching the exhibit of farm products that is being brought together for this exposition has ever been made in the Rocky Mountain region, and no farmer or land owner who attends it can fail to get helpful suggestions that will directly benefit him.

Probably at least half the states of the Union will have exhibits, as well as some foreign countries, and we of Colorado, as hosts, must make the best exhibits, or be discredited. Let's do it.

Farm Implements and Their Care

Hugh Scilley, Manager Loveland Factory

It is difficult for the ordinary farmer to afford, in the start, all the equipment he ought to have, but he should, as the years go by, provide himself with the tools that the needs of his particular locality and the crops he is raising make it necessary for him to have.

In the Northern Colorado territory, where intensive farming is practiced on such a large scale, the list of tools should be about as follows:

Farm wagons and beet beds, good plows, spring-tooth harrow, soil packer or roller, grain seeder, beet cultivator, mowing machine, beet puller, manure spreader, three-section harrow, disc harrow, float or leveler, beet seeder, corn cultivator (if needed), binder and ditching plow.

If you will take time to insert the price of each tool in the above list and add up the total, you will find that there is a large sum of money invested in tools, and that it will be good economy to take just a little time to care for them. I do not know of any greater leak on the farm than we have in the lack of care of our implements. When we finish plowing, instead of greasing our plow share and mould-board with a little hard oil or axle grease and putting it away in the shed, we unhitch from it in the fence corner and leave it there for a more convenient season, which seldom comes until the bright parts have become brown with rust. The same is true of our seeders and cultivators, etc. When we change attachments in the field, the tendency is to lay them (the ones we take off) on the ditch bank, and when we need them again we have forgotten where we put them and spend a few hours hunting them up, or trying to hunt them up, for very often we never find them.

We all know that the Colorado atmosphere and sunshine is very hard on wood work, and as most of our heavy agricultural implements, such as manure spreaders,

binders, seeders, etc., have a good deal of wood work to swell when wet and shrink when dry, it stands to reason that when not in use, they should be protected by a roof.

It is much cheaper to build a shed to protect the tools than to replace them, as there are more tools worn out by exposure than by use.

If we have a good machinery shed, and a place for each tool and its attachments, it is wonderful the amount of time you can save by being able to walk right to the place and put your hand on what you want, instead of hunting all over the place to find it, and even your wife will find you much improved in temper.

There is another advantage in having your tools assembled under roof, and that is that when the weather is bad and you cannot work out doors, you can always find plenty to do in the shed in making necessary repairs or in preparing for use the next tools you expect to need. If the tools were out doors or scattered around the farm, it would be too disagreeable to go out to do this with the result that you would have to waste half a day in doing it, when you ought to be at work with the tool you were repairing.

"Do it now" is a good motto for a farmer to adopt in the care of his tools and attachments, as it will save time and money, and sweeten the disposition.

All this has been said many times before, but have we profited by it as we ought, and will we profit by it in taking care of our tools after the present busy period of spring work?

Farming Without Livestock

From "Country Gentleman"

Some years ago the practicability of keeping up soil fertility without live stock was argued up one side and down the other at a North Carolina farmers' convention. One faction outlined rotations which, if adopted by cotton farmers would relieve them of any necessity of depending

upon livestock as supporters of soil fertility or as sources of income. At least so it was declared.

On the other hand the stockmen argued that the loss of the feeding value of crops turned under would make the plan altogether too expensive for farmers. Some of them said, too, that while the plan might work in theory it had never worked in practice and was not likely ever to work.

There have never been wanting men of standing in the South to try farming without livestock, and the cotton growing states have demonstrated what the results of such a system of farming are likely to be. The fertility of the soil has not been kept up, nor have the farmers, as a class, received a fair return for their labor.

The net result has been poverty of the soil and of the men who till it, and an enforced dependence upon one crop that has left the farmers almost helpless in time of emergency.

It must be admitted that the cotton farmers have not taken proper care of their soils, that they have not grown legume crops to turn under as recommended, and that they have not planned for a permanent system of agriculture. Neither have the wheat farmers of the far North, nor the corn belt farmers, who still depend upon the sale of grains for their incomes.

The methods proposed for keeping up soil fertility without live stock have not yet been tried out by any considerable number of farmers or for any determinate length of time. Few farmers are going to plow under legume crops continually. At times it is an eminently wise thing to sacrifice the feeding value of a crop to the immediate need of the soil, but the natural thing to do with clover or cow peas is to feed it to good livestock. The great majority of farmers who grow legumes will feed them, too—not for the sake of any theory, but because they know it will pay.

In the future, as in the past, the men who try to farm with little attention to livestock will likely be those who are looking for immediate returns, and are taking no thought for the soil's needs next year.

Home Canning

C. F. Schaale

The most widely discussed question of the present day is undoubtedly the high cost of living and the most plausible answer to the question to date has been "home canning." So important has the subject of home canning been considered in relation to home economics that the Agricultural Department at Washington has organized a bureau devoted to home canning. They have issued bulletins from time to time containing full information on the various subjects pertaining to home canning and all the information has been obtained from experiments conducted by some of the best chemists and professors of Domestic Science in the country. Canning clubs have been formed in school districts all over the country and at the present time over 10,000 school children are being instructed in the art of home canning. The old laborious method of standing over a hot stove all day in order to furnish the family with a few jars or cans of fruit or vegetables during the winter months, and all its uncertainties and failures has passed away with the advent of the cold pack and the steam pressure canners. It is a lamentable fact that over 50% of the production of the orchards and gardens goes to waste for the want of some simple way of taking care of the surplus product. Every well regulated farm should have a home canner of some description. It is just as important as the milk separator, fanning mill or corn harvester. Every child should be taught the art of home canning either in the school or canning club.

In order to understand why the home canner renders failure almost impossible it will be necessary to say just a few words as to the causes that have made home canning so uncertain. Over a century ago Francois Appert was the first to make a practical application of the method of preserving food by putting it in cans or bottles which he hermetically sealed. He then put the full bottles or cans

in water and boiled them for more or less time, depending on the kind of food. In Appert's time, and until recent years, it was generally thought that the oxygen in the air caused the decomposition of food. The investigations of Pasteur demonstrated, however, that it was not the oxygen of the air that caused fermentation, but bacteria and other microscopic organisms. Appert's theory as to the cause of the spoiling of food was incorrect, but his method of preserving it by sealing and cooking was correct, and the world owes him a debt of gratitude.

The home canning, therefore, has three things to contend with, bacteria, yeasts and molds, and in the limited space of this article only a brief description of each in its relation to home canning can be given. Spoiling of food is caused principally by development of bacteria or yeasts. Certain chemical changes are produced as shown by gases, odors and flavors. Bacteria are one celled and so small they can only be seen by the aid of a microscope. The process of reproduction is simple and rapid; the bacterium becomes restricted, divides and finally there are two cells instead of one. Under favorable conditions each cell divides, and so rapid is the work that it is estimated that one bacterium may give rise within twenty-four hours, to seventeen million of similar organisms. Yeasts which are also one-celled organisms grow less rapidly. A bud develops, breaks off and forms a new yeast plant, some yeasts and some kinds of bacteria produce spores. Spores, like the dried seeds of plants, may retain their vitality for a long time, even when exposed to conditions that kill the parent organisms. Yeasts and nearly all bacteria require oxygen, but there are species of the latter that seem to grow equally well without it, so that the exclusion of air in a jar or can is not always a protection.

Among the foods that are favorable to the growth of bacteria are those that are rich in nitrogenous substances if warmth and moisture are present. Among such foods are all kinds of meat, fish, eggs, peas, beans, lentils, milk, etc. These foods, therefore, are difficult to preserve under the cold methods. This is seen in warm, muggy weather when fresh meat, fish and milk spoil quickly.

Bacteria do not develop in substances containing a large percentage of sugar. Yeasts grow very readily in dilute solutions containing sugars in addition to some nitrogenous and mineral matter. Fruits are usually slightly acid and in general do not support bacterial growth, hence canned fruits are more commonly fermented by yeasts than by bacteria. Some vegetable foods have so much acid, and so little nitrogenous substance that very few bacteria or yeasts attack them. Lemons, cranberries and rhubarb belong to this class. Temperature is an important factor in the growth of bacteria and yeasts. There are many kinds of these organisms and each kind grows best at a certain temperature, some at a very low one, and others at as high as 125° F. or more. However, most kinds of bacteria are destroyed if exposed for ten or fifteen minutes to the temperature of boiling water or 212° F., but if the bacteria are spore producers cooking must be continued for an hour or more to insure their complete destruction and even then there is no certainty that the object has been accomplished, and right here is where all of the uncertainty and most of the failures of the old methods originated. The commercial canner accomplished the destruction of these organisms by applying a high degree of heat under pressure for a short time, and this makes a certainty of that which the ordinary housewife tries to accomplish by length of time in cooking, with the result also that the commercial canner has been able to retain size, form, color and flavor of his canned product, which has been destroyed in a large measure by the method employed by the housewife. Altitude also affects the degree of heat obtained by boiling, so that the boiling period must be continued much longer in the higher altitudes to accomplish perfect sterilization. At the Longmont altitude 212° F. cannot be obtained in an open kettle, as water will boil at 204½° F., at an elevation of 4000 feet.

The portable canners are of three distinct kinds, hot water with open boiler, hot water and steam combinations, and steam pressure outfits. The steam pressure

outfits can now be obtained at a minimum cost of $10.0(with full directions how to handle and operate, and witl such an outfit the housewife, with the assistance of he children can obtain the same results as the large commer cial canners. The work soon becomes a pleasure as i can be done at odd times out of doors, in the shade of a tree, instead of a hot stuffy kitchen.

The cold pack method of canning is superceding th old method of cooking in an open kettle and then trans ferring the hot product to jars or cans, and is simply this Place the product to be canned in the jars in a cold, rav state if fruit, or after scalding, blanching and cold dipping if vegetables, add syrup, brine or hot water as the cas may be, put rubbers and tops in place if jars are used, an if tin cans are used place on cap and seal, and then steril ize or cook. By sealing the jars or cans before cooking we have kept additional bacterial spores and moulds fron entering. Sterilization of the sealed jars or cans dispose of the bacteria and moulds in the jars or cans, and th contents should keep indefinitely.

The home canning club office of the Department of Ag riculture gives the following. In the language of the De partment specialist: "Plan your home canning work sc you will have a quart of fruit and a quart of vegetables fo every day in the year."

RECEIPTS FOR COLD-PACK CANNING

Soft Fruits. Prepare as you always have, pack in jar and add boiling hot syrup of about 18 per cent density Place rubbers and tops in position, not tight, and sterilize 16 minutes in the hot water canner, 10 minutes in th water-seal outfit, 8 minutes in the steam-pressure canner or 5 minutes in the aluminum pressure cooker under 1(or 15 pounds of steam. Remove the jars and tighten cov ers. Invert to cool.

Sour Berry Fruits. To can sour berry fruits blanch them in hot water for one minute. Remove and dip quick ly in cold water. Pack berries closely in containers and add hot syrup. Place rubbers and caps in place and ster ilize 16 minutes in hot-water outfit, 12 minutes in water seal canner, 10 minutes in steam-pressure canner under 5

pounds of steam, or 5 minutes in the aluminum pressure cooker under 15 pounds of steam. Remove and tighten tops.

Hard Fruits. If you wish to can apples, pears, or other hard fruits, remove the skins when necessary by blanching one to one and a half minutes and plunging in cold water. Pack in jars and add boiling syrup. Place rubbers and tops in position and sterilize 20 minutes in hot-water canner, 12 minutes in water-seal, 8 minutes under 5 pounds of steam, or 6 minutes in the pressure cooker under 15 pounds of steam pressure. Remove and tighten tops.

Citrus Fruits. Remove the skins and surface pulp. Plunge in boiling water for about a minute and a half, and dip quickly into cold water. Pack in jars and add boiling hot syrup. Place rubbers and caps in place and sterilize 12 minutes in the hot-water outfit, 8 minutes in the water-seal type, 6 minutes under 5 pounds of steam pressure, or 4 minutes in the aluminum pressure cooker under 15 pounds of steam. Remove jars and tighten covers.

THROUGH THE LEAVES

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Agricultural Notes

W. P. Hogarty

The thinning is practically completed without any of our crop suffering from lack of attention. There was a time during the cold period and after the frost when it looked discouraging for a good stand of beets, but they have blocked out well, with less than 700 acres replanted. The labor condition has been fine, the farmers hiring their help direct without any aid from the Sugar company. This is such a contrast to a few years back when I recall we brought in beet labor from Canada at a cost of upwards of $30.00 a head.

The first cutting of alfalfa is a short crop, due to the extreme cold weather and late frost, but the second cutting is coming on nicely.

Fall grain is looking extremely well, and the spring planting is a little late.

+ + + +

We have had frequent rains this spring and the surface soil has been kept wet with the result that small grain and plants did not have to root down for moisture, consequently some plant life is showing the need of water before we thought it possible. Then too, the heavy freezing of the past winter has loosened up the soil until those who have been irrigating alfalfa and wheat have remarked that the soil is taking up an unusual amount of water.

+ + + +

You are all in the field with the cultivator now, but some are doing the work so much better than others. The mere fact of driving a team through the field hitched to a cultivator is not cultivating, nor does it give you any results. Some of the wet, heavy lands have not been pleasant to work, but right here is where it takes head work in order to cultivate so as to benefit the plants. If you are going to cultivate deep, do it in the early life of the plant. I saw a bad case of black root the other day and the soil was so

very hard around it that the cultivator tools were dragging along on the surface. That field of beets could not make any growth until the soil has been loosened around the beets, and with sharp duck feet and a slow walking team you can accomplish a great deal in a bad field.

+ + + +

Before the next issue of this paper you may have web worms in the field. Mr. Maxson has spoken at length on the life of the miller and worm and treatment in previous issues. Remember to call us up at once if you detect any evidence of worms, and we have an ample supply of sprayers on hand should you need them.

+ + + +

Mr. Richardson is getting along nicely with the measuring and will probably complete his work the coming week.

+ + + +

We have had frequent calls from the growers the past week that the bugs are beginning on their beets. We have not found anything serious to date. The leaf hopper has appeared in spots, also the flea beetle and in some districts the grasshoppers are reported thick, but are doing no damage as yet. Don't fail to call us up for any cause and especially if anything new is working on your crop. The telephone numbers are Longmont 406 Factory office; Residence numbers, N. R. McCreery, Longmont 176; W. P. Hogarty, L. 177; Lee McMillen, field superintendent, L. 412; C. F. Johnson, L. 396.

+ + + +

We are publishing the crop reports given by the agriculturists of the several northern Colorado factories, believing they will be of interest to the growers of our district.

+ + + +

Mr. H. H. Griffin, agricultural superintendent of Fort Collins factory, writes under date of June 21st: "Crop prospects are good, the season backward, but splendid moisture conditions. Thinning well along, and beets making good progress."

+ + + +

Mr. D. W. Carr, of the Swink factory, writes on June 23rd that the beet crop in the Arkansas valley never looked

more promising, and that the thinning is completed. Canteloupes and cucumbers are late owing to the first planting being taken by frost. The first cutting of alfalfa is light and small grain doing well. With a continuance of present conditions Swink should have the largest tonnage of beets in her history.

Crop Report---Greeley

Hiram Timothy, Agricultural Superintendent

Beg to hand you herewith agricultural report from the Greeley factory made up as of date, June 15, 1915.

Since our last report the precipitation, as recorded at the Greeley factory, has totalled 2.03 inches, distributed as follows:

June 1	.66 Inches
June 3	.46 Inches
June 7	.65 Inches
June 9	.26 Inches

The last two storms were accompanied by hail, but the Greeley territory was extremely fortunate in escaping with very little damage, probably not to exceed 100 acres being taken by the hail. It is a little early as yet to estimate the amount of damage from this source and we will comment further on it in our next report.

It will be noted from a perusal of the report that we have contracted to date 16529 acres as against 9339 acres on corresponding date the previous year. It will also be noted that our replanted acreage is quite a little in excess of last year and higher than we estimated at the time of the recent meeting in Greeley, due to continued cold weather, cut worms and wind.

We had extremely cold weather last week, but weather conditions appear more favorable at the present writing than they have for some time. Our early beets are growing very nicely, but the late planted beets, while we have universally good stands, have not shown the growth they should on account of the cold weather.

We have 7172 acres thinned as compared with 6508

acres a year ago. The continued wet weather has re tarded thinning considerably, but we have plenty of labo available for this work as soon as the beets are ready fo thinning.

Despite the unfavorable growing conditions that hav prevailed this spring, indications all point toward the har vest of a good crop.

Last week we lost about 70 acres of beets from cut worms, 32 acres of which were thinned. This was at Au burn where the land was cold and heavy and the worm just developed last week. This is the latest I have eve seen cut-worms bother the beet crop in northrn Colorado

I will say, however, that our greatest loss was by reaso of cold, wet weather. It will be remembered that th four weeks in April, and the first week in May were warm and the farmers were all anxious to get their beets plant ed as soon as possible. The land was turned in the bes conditions possible with plenty of moisture which en abled the farmers to prepare a seed bed in the very bes conditions.

We were planting a great many beets at this time, an the germination was extremely good, but on Monday af ternoon, May 5th, it turned cold and started to snow an continued to snow and rain for five days. The thermom eter stood for some time at 25½° above zero. At this tim the beets that were planted in the last week of April an the first week of May, had germinated in a great many fields, and the roots were from an inch to two inches long In a great many fields the leaf had left the seed ball or pod but had not reached the surface. Where these conditions existed is where we lost the greater part of our beets th past season. The plant is at its weakest stage as you know when the sprout first leaves the pod and before it gets its nourishment from the earth, as practically all its strength comes from the germ until the plant gets to the surface of the ground, where it gets the air and the light of the sun. Then it begins to feed from the soil. It is a well defined law of nature that it requires two elements to germinate sugar beet seed; that is, heat and moisture. Without moisture they will lay dormant; with moisture and without heat they will rot and this is what we have had this sea-

son in Northern Colorado, moisture without heat. This is what killed our beets that had sprouted and had not got up where they could get the air and light.

On our replant, however, our beets look fair with good stands. Our beets are two weeks late on account of late spring, but I think with favorable weather conditions they will catch up before harvest so it will not detain us for a good early harvest with good tonnage and good sugar.

Crop Report---Sterling

R. M. Barr, Agricultural Superintendent

June 24, 1915.

The beet crop in Sterling district has gone through a great deal of grief since our seeding commenced on April 12, 1915. Since that date we have had a succession of rain, snow, frost, hail and wind storms, and while our replant has been very heavy, or approximately 20% of our plantings, we still feel quite optimistic about the final outcome, a good crop.

Our first planting was on April 12th, and on account of excessive moisture, was very slow until May 1st when we had only one-fourth of our crop seeded. To May 1st it was simply a matter of mudding in a few beets between showers, and on our heavy lands along the valley, progress was naturally very slow.

At this date we have only about 50% of our crop thinned but they are looking well and up to average of past seasons, and with our lands absolutely full of moisture, and our replant all germinated, and the greater part of it rowed up, even though late, we believe our crop prospects good.

In the Julesburg district we have had from February 12th to date, an unprecedented precipitation of 24.40 inches. In April we had 8.44; May 7.92 and so far in June 4.68.

We have had some very severe hail storms throughout the district. On June 10th we had a very severe one north of Sterling, which damaged 2,500 acres of beets,

cutting the stands badly on thinned beets. This was followed by a very heavy wind on the 11th and 12th over the entire district, causing our heavy replant. The snow storm of May 18th almost ruined our first cutting of alfalfa. We had 7 inches here, and 13½ inches in the Julesburg district. The stems were so badly broken that lots of it dried up, and with continued rain storms the farmers have not gotten it all in stack yet. Winter and early spring wheat and alfalfa in the hailed district is entirely gone, but later grains are looking well again. On some alfalfa fields that were cut two weeks ago, the second cutting will be ready by July 6th, so that three more crops may be cut on some of the land, partially making up for the loss of first cutting.

So far, we have had no trouble with pests, grasshoppers, or web-worms, and if they will only confine their feeding to the nice luscious weeds along the roads and in fence corners and waste lands, when they do appear, we feel satisfied that there is quantity and variety enough for epicures of their species.

Crops throughout this territory are looking very promising, and we look for a bounteous harvest in Logan and Sedgwick counties.

Crop Report---Windsor

Chas. E. Evans, Agricultural Superintendent

June 23, 1915.

Replying to your inquiry as to the general conditions of the beet crop in our territory, am glad to advise that the outlook is very promising at present. Parts of the Windsor territory have been visited by several hail storms which caused some replanting and left some fields with stands not quite up to the standard, but we have been favored with good growing weather for the past two or three weeks and the crop has made good progress. We are expecting, and believe we will have, a larger yield than last year.

Crop Report---Fort Morgan

H. C. Giese, Agricultural Superintendent

June 23, 1915.

Agricultural conditions of the beet crop at Fort Morgan and Brush have improved considerably during the past eight days. The 4000 acres replant out of 20000 acres planted are coming on nicely and, with favorable growing weather from now until October 1st, should make a very satisfactory crop. Thinning is being accomplished rapidly.

The first cutting of alfalfa is being put up and, on account of the unfavorable climatic conditions, the first crop is less than one-half the normal yield. Small grain is backward but making a satisfactory growth at this time.

Very little irrigation has been necessary up to the present time. Reservoirs are all filled to capacity and, with the ground full of moisture, plenty of sunshine and warm weather from now on should spell bumper crops at harvest time.

The lateness of the beet crop in Eastern Colorado this year should, to a great extent, eliminate the damage due to the leaf spot disease. Last year the leaf spot only affected the plants seriously when they had reached about half of their normal size. This was especially so during the past two years in Eastern Colorado and Western Nebraska when the plants had reached this growth during the extreme hot weather when the temperature did not lower considerably at night. This leaf spot was instrumental in cutting down both the tonnage and the sugar content of the beets. If the above theory is correct, the damage due to the leaf spot should not be so severe with us this year as in the past, as a great many of our beets will not have reached their normal growth until the nights become cooler and, for that reason, the development of the leaf spot disease should be materially lessened.

Every beet grower should devote a great deal of his

time in the beet field while the blocking and thinning is being performed and see that as good a stand is being left by his laborers as is possible. A poor stand of beets will be a great handicap in getting the maximum yield per acre.

Crop Report---Eaton

C. H. Turner, Agricultural Superintendent

June 24, 1915.

I am in receipt of yours of the 21st, requesting report on crop conditions for your next issue of "Through the Leaves." We contracted this year 14,046 acres, 520 acres of which is in the Kimball, Nebraska, district. The following is a synopsis of our agricultural report of June 15th.

Contracted acres	14,046
Planted acres	13,838
Replanted acres	2,011
Thinned acres	4,331

Field work up to this time has progressed very slowly, due to the numerous wind and hail storms which we have had. The 4,331 acres which we had thinned on the 15th is only about 31% of the total acreage planted, while last year on the same date we had thinned 57% of the total acreage planted. However, the weather for the last ten days has been favorable and all work is progressing rapidly.

During the second week of June we had two heavy hail storms which extended over about 50% of our district and did considerable damage, and especially to the smaller beets. The hail was followed a few days later by a very severe wind storm, which blew out entirely about 1,000 acres of beets and damaged more or less about 50% of our entire crop.

The present outlook in our district is for about 50% of our acreage to make a good yield and the balance will not come up to normal.

Crop Report---Loveland

Hugh Scilley, Manager

June 24, 1915.

The prospects for a bountiful harvest are very good at the present time. The wheat crop has mostly been watered and while spring wheat is a little later than last year, it promises well. Oats and barley are also looking well.

The first cutting of alfalfa is very light, owing to being nipped with frost several times in the late spring. It is mostly in the stack, and the second cutting well started.

The beet crop is about 90% thinned, and in this district practically the entire contracted acreage of 17,000 acres was planted. The abundant rainfall has given us a good stand, and while the spring was late, and the growth rather slow, the early planted beets, especially those on fall-plowing, are covering the ground pretty well, and showing a fine growth. We have close to 5000 acres of early beets that are now in this condition.

The later plantings are coming along nicely, except in places where the land was plowed or worked wet. While we succeeded in getting a reasonably good stand on such land, a great many of the beets have since died with black root, and those that survived have not entirely gotten over their stunted look. The recovery has been more marked where the cultivator was used as early as possible to loosen the dirt around the roots and admit air.

Our first crop of beet seed looks like it might be reasonably successful, providing the weather conditions are as favorable to the end of the season as they have been up to the present.

Pedigreed seed planted to grow stecklings for next year's beet seed crop has given us a beautiful stand, with a light seeding, indicating that when we get home-grown seed it will be strong in germinating power.

Alfalfa Pasture for Pigs

H. H. Simpson

The various experiment stations are continually working on methods of feeding to cheapen the production of meat and the hog has received especial attention because of his value to fit into most systems of farming. In starting these tests the stations do not all have the same objects in view, as for instance, in Missouri, exhaustive forage crop experiments were conducted to show how best to utilize the large corn crop, while throughout the west it is a problem of larger returns from the present forage crops, by supplementing with a minimum of high priced grain. Whatever the objects, the results are all valuable in the same way, that is; by throwing more light on the two ever perplexing problems, reducing the cost of production and furnishing a higher market for the crops. These will again be recognized as the two fundamental factors in determining profit on farms.

Alfalfa has been, and probably will continue to be, one of the principal crops for the irrigated sections of the west, and as the cash market fluctuates up and down, the farmer should always be prepared to furnish his own market, at least during periods of low prices.

It is well understood that the digestive tract of the pig was intended by nature to make use largely of concentrated foods, and only a minimum of pasture or other coarse forage, but the high price of grain in recent years has made it necessary, in order to produce pork economically, to make the greatest use possible of feed that can be cheaply grown. With these conditions prevailing the most successful pig growers are at present utilizing forage crops for making at least half the weight of a 200-pound hog.

The growing of pork on alfalfa pasture supplemented with a medium allowance of grain, offers a good opportunity for increasing the profits on part of the acreage of alfalfa, by: first, paying a better price for the crop; second,

by greatly reducing the cost of harvesting; and third, by eliminating the cost of handling the manure. Since this crop is high in muscle and bone building material (protein and mineral matter), it is especially valuable, and when properly managed, offers a cheap source for the nutrients which usually cause a feed to be high in price. If pastured when too young it contains so large a per cent of water that the pig can not eat enough for proper nourishment. A pasture too closely grazed gives the same results. The method of management should make sure that there is always an abundant supply of fresh, tender alfalfa, sufficiently well grown to contain a good supply of nutrients. It is always better to under-graze than to over-graze, in fact the best results are obtained when stocked light enough so that mowing may be necessary at times. Such arrangement will reduce the rooting to the minimum and keep the pasture free from weeds and woody, tough alfalfa, and also allow the new growth to come on more evenly.

In any system of farm management it is important for the farmer to know how he can secure the largest net returns from an acre of land. During a period of five years the writer conducted experiments testing various methods of managing pigs on alfalfa pastures. The complete results of these tests are reported in New Mexico Bulletin No. 90, which can be supplied to any who may be interested. During this time the returns per acre of alfalfa ranged from $14.03 to $28.82, the smallest return being received for only 59 days' pasturing and the largest for 120 days. It can be seen that the returns only show for part of the season's yield and should be much greater for the entire pasturing period. Other pigs and brood sows were run on the pastures during the remainder of the season but no records were kept, as the objects of these tests were only to compare the grain substitutes and the amounts to use, and for this reason the pastures were used only while they were in a comparative condition. In this part of Colorado alfalfa will usually furnish good feed for at least 5 months, which, at the above rate would give returns varying from $16.30 to $52.55.

Much has been said about the amount of grain that is

most profitable to feed to pigs while grazing them on pasture and I have talked with farmers who believe that more profit can be made if no grain at all is fed. However, the results obtained at other experiment stations, and the opinion of the most successful feeders, bear out my own experiments that the best results are obtained with growing pigs when some grain is fed. Sometimes it is profitable to keep dry, mature sows on pasture alone, but if two good litters a year are expected, they should always be kept strong and in a good healthy condition by a small grain feed.

In one experiment where 32 pigs were pastured for a period of 65 days, the following results were obtained:

	Gain per head	Returns per acre for pasture
Lot 1. Alf. pasture alone	16.5 lbs.	$16.48
Lot 2. Alfalfa pasture. 1.25 lbs. grain per head daily	43. lbs.	22.39
Lot 3. Alfalfa pasture, 2.5 lbs. grain per head daily	48. lbs.	16.85
Lot 4. Alfalfa pasture, 10 lbs. skim milk per head daily	39. lbs.	19.58

This tells its own story, regarding the amount of grain most profitable under these conditions, but it will be noticed that where the heavy ration was fed, although the gains were three times as much as those on pasture alone, the returns per acre of alfalfa were practically the same. The grain cost $1.50 per cwt.

As alfalfa is rich in protein and ash, naturally the grains that will give the best results in connection with it are the carbonaceous, as corn, wheat, milo or kafir, etc., although this will depend a great deal on the price.

With a greater development of dairying in this section, naturally skim milk will play an important part in the hog industry of the future and it may be interesting to give here something of the value of this food with alfalfa pasture. In nearly all the experiments that the writer has conducted, skim milk was used in one or more of the lots and compared with various kinds and amounts of grain.

One year 27 pigs were pastured for a period of 120 days with the following results:

	Gain per head	Cost of Sup'm'nt'ry feed per 100 lbs. gain
Lot 1. Pasture and skim milk	30.5 lbs.	$4.11
Lot 2. Pasture, skim milk and milo	33.1 lbs.	3.50
Lot 3. Pasture, skim milk and shorts	34.5 lbs.	3.64

It can be seen that by supplementing skim milk with milo, pork was produced 62 cents per hundred cheaper, and when shorts were fed, 47 cents cheaper. Although skim milk and alfalfa pasture are practically the same kind of food, being nitrogenous and bulky, they will give a fair profit, but the value of the milk can be practically doubled by supplementing with a carbonaceous grain. It is especially valuable for feeding the pigs when first weaned as it makes the change from mother's milk easier. It is an easily digested food and aids in the digestion of the grain. The cheapest pork produced during the five years' tests was made with skim milk and ground milo. When fed alone it is worth at present prices of grain from 15 to 20 cents per cwt., but this can be increased with the use of grain until it will be worth 30 to 35 cents.

In conclusion I may say that farmers should not overlook the fact that the cost of producing pork can be materially lessened during the summer months by the use of alfalfa pasture and a small allowance of grain. As our conditions are now, no farmer should attempt to grow pigs without the use of alfalfa pasture and many who are growing large acreages of alfalfa could undoubtedly get greater returns per acre by using some of it for pasturing pigs. After deducting the gain which the grain would make if fed alone, the above experiments indicate that a gain of 782 pounds of pork may be credited to one acre of alfalfa.

In managing the pastures they should be fenced into two or more fields of equal size so they can be alternated, and it is not best to turn on them until there is growth 5 or 6 inches high. It will pay when the pigs are changed to run over it with a mower before irrigating, even though no hay of consequence is obtained, for it will take off the

old growth and give better opportunity for the new. Do not over-stock as the danger of damage from rooting and tramping is much greater and the pigs will not do well. To get the best returns and produce the cheapest pork pigs must never be allowed to stand still or become stunted. There is no rule to go by in regulating the amount of grain to feed as it will depend upon the price of grain, price of hogs, size and the length of time wanted to feed for the market. An acre of alfalfa will carry from 8 to 15 pigs, depending on the size of alfalfa and the amount of grain fed.

Consider the Mule

News from the front exploits the mule. In the midst of death the mule is faithful and serene. In the choice of dangers he is wise. "If I had my way I'd stay close to the mules; they have an instinct for safety," says a soldier. In a gathering storm a few days ago a Pennsylvania farmer tried to drive two mules into the small stable on his place. They refused to go and forced their way to the larger stable. A minute afterwards lightning struck the small stable. Farmers could multiply instances of this sort indefinitely. The mule has supersense.

As to common sense, the mule is a past master. He will not overwork. He will not overstrain. If he is too hot he will cool off. After his work he will have a bit of play before he eats. He is a noble example to man in both eating and drinking, for he is the soul of moderation. He lets the horse do the fancy things and get sunstruck and die of acute indigestion. He lives. How long does he live? Who knows? The mule never gives up, and whoever hears of a mule dying?

Behold the mule's dignity. Is there anything like it? In war or in peace, in cotton patch or in city thoroughfare, he carries his own majesty and always pulls his share of the load. This is efficiency.

Alfalfa

Lord Ogilvy

There seems to be a serious loss on our alfalfa crops if we consider the possible yield and that usually obtained. There are some men getting a yield of between six and seven tons to the acre. They are, however, alfalfa specialists, who both work and manure their alfalfa and keep it as long as the stand is good. In an ordinary rotation, if the manure be applied to the alfalfa we have an excess of fertility after the break and no manure to apply in the third, fourth and fifth years of the five year rotation, so that manuring alfalfa may not suit the beet farmer although applying manure to pasture or clovers is most profitable under ordinary conditions. Because the alfalfa is not manured, however, is no reason for otherwise neglecting it, using poor seed, allowing it to go uncultivated or leaving it unclipped to be destroyed by fungi when frosted. There are some cut worms, but there is a great deal more winter killing of plants from soft alfalfa grown from seed entirely unsuited to this climate.

Cultivating alfalfa exposes the grasshoppers' eggs, loosens the soil to absorb moisture, stimulates the growth of alfalfa as it does of any other crop, and lets the deep-rooted alfalfa get ahead of the weeds. Whilst alfalfa should not be worked when very wet, it can usually be done when other fields are too wet to bear teams and machinery especially after the alfalfa has started a little growth and is drawing on the soil moisture.

It is about time folks quit being governed as to cutting by the bloom on alfalfa which depends on the variety and climatic conditions. Alfalfa has buds on its crown that will tell the condition of the plant and the time to cut. Alfalfa is always prepared either to be cut or to go on and make a seed crop if conditions are sufficiently

favorable. About the time it has made the top growth t season warrants, the new buds on the crown should be a tive and ready to start should the top growth be laid l rain or fall of itself, in which case the buds will shoo make branches and come through the old alfalfa.

If cut when the buds become active there will be a immediate growth of strong branches. If cut too late t processes of bud growth have to be made over again we get merely a branch growth from those that have bee clipped, which accounts for so many poor second crops alfalfa.

Whether to cultivate in summer depends upon wheth the bud needs stimulating and the branch growth chec ing, also how the ground takes water. It's easy to g through the motions of irrigating a field of strong land u cultivated and well baked without accomplishing an thing, and some water spreaders will not test the grour with their shovel to ascertain the penetration of water. have seen fields you could race horses over two days aft they had been irrigated. Opening the top of the grour insured the entry of the water, and if it even then does n go deep enough it can be deeper cultivated next time. A a rule, open, loamy or sandy soils will not need summ cultivation, but as they are the favorite nesting places grasshoppers they should have attention either in the fa or early spring.

Meteorological Report

For May---	1915	1914
Maximum temperature	89	86
Minimum temperature	26	33
Monthly mean	51.4	57.1
Normal	—5.2	+ .5
Precipitation	2.97	3.47
Normal	— .29	+ .21

Fixing the Pike so it Will Work

From Denver "Field and Farm"

The master mechanics who have to do with the destiny of the state are very active these days in assuring us as to what they propose to do in improving our highways and we hope they mean business. The people of Colorado have been spending more than a million dollars a year for the past two or three decades and taken as a whole they are not so good now as they were forty years ago. Our natural trails made by the pioneers in crossing the plains were the best roads in the world, but civilization has a way of coming along and mussing up these things so that they are almost impassible when wet spells some.

The automobile business, the tourist travel, the imprecations of the farmers, the maulings of the public press and the blitherings of the politicians have finally set up a keen public interest in our thoroughfares so that we may now look for better things and goodness knows we need them bad enough. No one element of civilization in our country has been more neglected than the improvements of our roads, yet this is the one thing that marks the line between barbarism and civilization in any country.

The founders of our government strongly advocated the necessity of opening up and improving the means of internal communication. The immortal Washington retired from the pomp and circumstance of glorious war to occupy the honorable position of a sovereign citizen, and while conducting the affairs of his plantation was president of a transportation company.

Our national government has expended more than a billion dollars for the improvement of our harbors and waterways. If such expenditures of the national treasure have been made in the past for the development of railroads and waterways, is it not most appropriate that the improvement of our roads should receive national attention and government aid? Any measure that brings to the homes of the American people the daily news of the

world, that gives the sovereign citizen the truth concerning the affairs of his own country, that affords him the knowledge of the conditions and necessities of his own people, enables him to discharge the duties of his citizenship, benefits the entire country and gives strength and character to the nation.

The wealth of the nation comes primarily from the ground. The factory and the foundry utilize the products of the soil and mine. As agriculture is our principal industry so the great mass of our rural people are our main dependence and we owe them better transportation facilities, especially so now that motor power is coming to cut such a figure in our rural economy. Every measure, whether by the national government, the state, county or municipal authorities that can promote the welfare of the farmers should be earnestly advocated and put into effect. The railroads have been crabbing most of our heavy traffic by building splendid systems and these may possibly have had some effect in pushing back the work that might otherwise have gone into the highways. A great change is coming over the proposition, however, and we must now look more into the utilization of our pikes in getting around the country. We can do a whole lot along this line before the flying machines come into general vogue.

HIGH BROWN, HIGH PRICE.---"Farm products cost more than they used to."

"Yes," replied the farmer. "When a farmer is supposed to know the botanical name of what he's raisin', an' the entomological name of the insect that eats it, an' the pharmaceutical name of the chemical that kills it, somebody's got to pay."---Anderson (N. C.) Intelligencer.

Deep Plowing

From Denver "Field and Farm"

Few things are so unpopular with the farmers of the West as deep plowing. Fair results are often obtained by shallow plowing during wet seasons for the reason that whether a man takes care of his land or not, if there is sufficient rainfall to soak the subsoil the roots of a crop do not stop at the bottom of the furrow, but go down into the moist solid dirt underneath. But even in a wet season like this, for instance, deep plowing always pays. When a storm comes on the water goes down by capillarity or gravity, or both combined, until it is too diffused to go any further. Capillarity ceases for the time being until another storm comes and starts it again; then it goes down again until it stops for lack of water. If we make a test of this soil for moisture a day or so after a storm, when capillarity has ceased working, we find we have no more moisture in the soil than we had before, the percentage is the same, but it has gone on farther down. We are merely obtaining a greater depth of moist ground. Some farmers plow shallow owing to a misconception of this action of moisture. They expect the moisture to rise by capillarity to dampen the crust and hold the drouth at bay, when as a matter fact the capillarity is already exhausted by the downward pull of gravity. The best plowing for the forthcoming seeding of fall grain will occur during the next thirty days and should be completed by the 20th of July, so that the breaking may have time to settle before the planting in September. Conditions predicate enough moisture for good plowing this season.

The Kaiser in the Trenches

(Translated from the German of Otto von Pumpernickel, Poet Lariat, by the Longmont Call's staff poet, Hans Taugenichts.)

Der Kaiser he koompt an der firing line,
  (Ven der fire on der line vos oudt);
Unt he called in der General Schlippen von Stein,
  To find vot all dings vos about.

"Say, vot haf you did on dese firing lines,
  Unt vot odder great deeds haf you wrought,
In der name of your glorious Kaiser, dot's me,
  Unt dot odder young feller, dot's Gott."

Den oop spoke der valorous Schlippen von Stein:
  "I take dwenty cathedrals unt spile 'em;
I slinged at der Frenchies ein tausand stink pots,
  Unt burned down a orphan assylum."

"Come here to your Kaiser, O valiant von Stein,
  Unt kneel at der feet of der boss,
While I pin on your bosom, O hero of mine,
  Our glorious old Iron Cross.

"Unt I dinks me, by Himmel, if dese glories keeps up,
  While Gott unt mineself iss der bosses,
I telephones quick to der Baron von Krupp,
  For anodder car load of dese crosses."

THROUGH THE LEAVES

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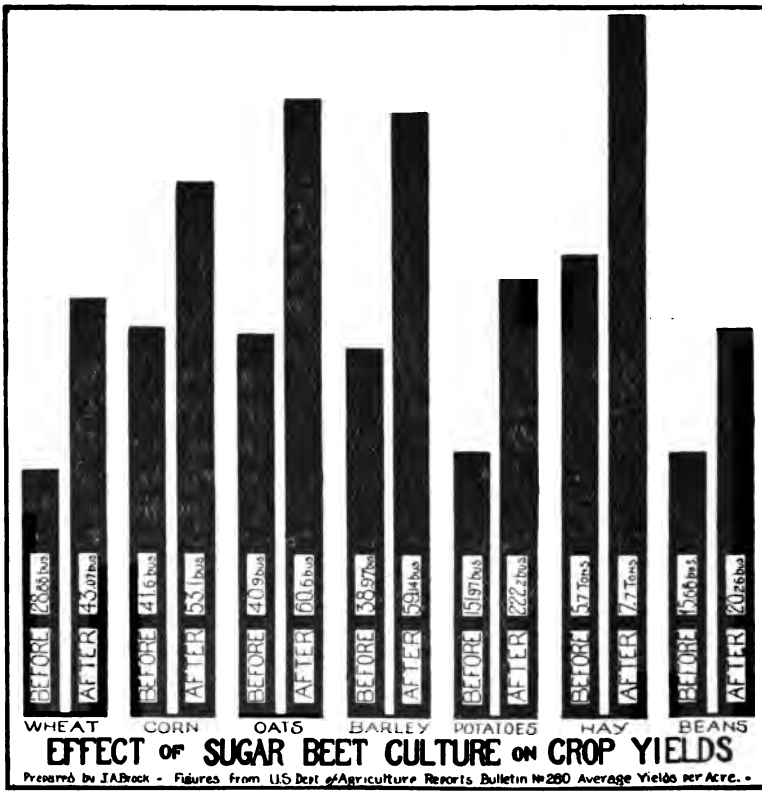

EFFECT OF SUGAR BEET CULTURE ON CROP YIELDS

Prepared by J.A.Brock - Figures from U.S. Dept of Agriculture Reports Bulletin №280 Average Yields per Acre.

Agricultural Notes

W. P. Hogarty

We have just arranged for about 500 old filter cloths which we would like to trade for beet seed sacks at the rate of two filter cloths for each sack. Our field men will have a supply of these cloths with them and you can secure them by asking them or calling at the factory.

+ + + +

All crops are looking well and the harvest of fall grain is well under way.

+ + + +

How about that high price for wheat during war times?

+ + + +

A grower called up the other day and wanted to know what tools to use on a cultivator after irrigation, assuming that the foliage covers the row at the time of the first irrigation, which I believe is the case in 85% of our beets. If the cultivator is used at all, I would say to re-ditch would be all that was necessary. When the foliage is large and brittle, I think more damage can be done to the beets in the breaking of the leaves than will be gained by cultivation.

+ + + +

Irrigation of beets, if you have an abundance of water, is one thing and irrigation with a shortage of water another. For instance if you only have water for one irrigation, when is the proper time to apply it? Pretty good subject to sidestep. If you let the beets burn up you won't have anything, and if you irrigate now and can't later, without very favorable weather, you needn't expect much of a crop. Personally I don't think beets could have been watered at a better time than last week while the weather was cool. After the leaves thoroughly cover the ground you are not liable to hurt the beets with water, providing it doesn't stand on the surface. I would try and keep my beet land moist well up into September. It will mean easier work at the time of harvest, and you

will not be taking as great a chance of losing your sugar content by a new growth.

+ + + +

There is a heavy growth of weeds along the roadside, fence-line and ditch banks this year that ought to be mowed and burned. Some job, I know. But grasshoppers are appearing again and if these places are kept clean the breeding ground will be changed to a point where we can get at it with the disc. One farmer in our district plowed up the waste land along the road and put it into oats. It at least affords good forage for his milk cows which are turned loose on the highway, and looks much better than weeds.

+ + + +

Haven't heard any complaint yet about web-worm moths, but be on the lookout for them. Remember we have Paris green if your merchant has run out and plenty of spraying machines. Below is Mr. Maxson's dope formula for hoppers:

POISONED BRAN FOR GRASSHOPPERS

Bran	20 lbs.
Paris Green	1 lb.
Syrup	2 qts.
Oranges or Lemons	3
Water	3½ gal.

Mix bran and Paris green while dry. Squeeze juice of lemons or oranges into water, slice remainder of these finely and add to the water. Dissolve the syrup in the water. Pour this water over the bran and poison and stir until the bran is uniformly dampened.

This poison should be scattered very thinly over the ditch banks and borders of fields wherever hoppers are numerous. Do not scatter it in large lumps. To secure the best results the poison must be spread early in the morning, before the sun is up; never spread it in the middle of the day as it will soon dry and become useless.

Care must be observed not to spread it where stock or poultry can get at it, as it will kill them. Turkeys are more apt to eat it than hens.

The above will make enough poison bait to cover four or five acres.

What Have You Done and What Is There to Do?

W. P. Hogarty

A gentleman said to me the other day, "If you will give me the subject I will be glad to write you an article for 'Through the Leaves.'" And for one who is capable of writing an article, I believe its subject is its hardest part.

We have departments in The Great Western Sugar company's organization that if nothing more give you food for thought, and as Mr. Lippitt has extended the different departments and especially the Agricultural Staff, an invitation to contribute to this sheet, I will endeavor to give you a little food for thought, and at the same time may elicit some criticism. But owing to the support this publication is to receive from my co-workers in the future, this is probably my last effort, so I am going to try and give a summary of the work, which I want it understood is only applicable to the Longmont factory.

Mr. Giese, Agriculturist of the Fort Morgan and Brush factories, in a previous issue, has written at length, and a splendid article too, on the duties of an agriculturist, and we have done all the things he mentioned and some more, the detail of which we will not make public. But I am going to try and show what we haven't done, and to clearly state my case, I have to start at the beginning of the work in my present capacity some twelve years ago.

A few months prior to coming to Longmont, I had the pleasure of a visit from Mr. Officer, who was then manager of the Loveland and Longmont factories. I was living on a farm near Greeley, and the object of his visit was to ascertain why I had not fulfilled a contract for the growing of ten acres of beets for the Loveland Sugar company. There is some good to come from everything, and out of this meeting there developed a friendship that caused Mr.

Officer, the following winter, to tender me the position which I now occupy.

Longmont had grown one crop of beets before my connection with the factory, and before accepting the place I was informed by Mr. Officer that the relations between the factory and the farmer were very cordial, and the farmers much interested in the industry, and you can imagine that they were when their previous and initial crop averaged about 8½ tons per acre.

In entering upon my duties here as agriculturist, Mr. Officer said, "Will, I wouldn't say anything about not having had any previous experience in the growing of beets." I followed his line of thought. He knew we had a wise lot of farmers and that it was unnecessary to advance that information.

I was employed on the basis of a sliding scale, that if we succeeded in securing a tonnage equal to 50,000 tons of beets, I was to receive an additional $25.00 per month on my salary. We didn't quite make it, but through the kindness of Mr. O., he caused a sufficient tonnage to be diverted from Loveland (by the way Loveland has always come to our rescue) so that I was paid the premium, but we did get an acreage of 3703 acres and by the assistance of my lieutenants and Mr. Downer, who was a strong factor in the development of this plant, and with providence being on our side, we harvested a crop averaging 13 tons with the sugar content of 17.4%, and I want the agriculturists to take notice that this result in sugar per acre is far above your average or the average of this factory. We have had two years where the result was a trifle above my first year's result, but you don't know how it was obtained, neither do I.

The first year we tried growing a double crop, say eight tons of beets and eight bushels of wild oats, and the wild oats were that bad that Mr. Morey at one of our agricultural meetings held at Denver, intimated that possibly some of the oats might have been sown by members of this department. At this time in our history it was a feather in a man's cap to get a farmer's name to a contract regardless of the condition under which the beets were to be grown or the results to be obtained by the

grower. This practice, however, was long ago abandoned.

In the early history of the industry here the previous crop had been grain and alfalfa, and consequently the average plowing was only about four inches in depth, and in twelve years in our industry the average has increased about two inches in depth and with everybody advocating deep tillage, that isn't advancing very rapidly, is it?

For the first few years we had a scarcity of, and inexperienced labor. The farm tools were not modern as now, and as a result many beets suffered from the lack of care, and at the proper time. Yet the first four years, eliminating the initial year, we had more sugar per acre than any like period since. Why?

As a comparison, in the beginning we had inexperienced farmers, men not familiar with intense cultivation; labor that was not nearly up to the standard of efficiency that they are today after twelve years of experience. Foul growth without end, and you might say an inexperienced agricultural staff. Today we have the best farmers in the country. No better and cleaner soil lays outdoors, and generally speaking, water-rights second to none. Climatic conditions ideal. Labor plentiful, and the same that we had in the start with twelve years' experience added, and with more modern tools, yet the results are as I have stated.

In the beginning at Longmont the average acreage of beets grown per man was a little over ten acres. Today the average is something over sixteen.

My basis for this article is taken from the Government Weekly News Letter of July 21st, which appears in another column of this issue, and headed, "Loss in Beet Yields." It states in this article that the United States, with the exception of Russia, produces the lowest average beet tonnage of any country in the world, and its cause, the variations in yield by deficiencies in stands. Speaking off hand I don't think our percentages of stand are any better today than in the beginning, and the per centage of eight-ton growers about as usual. You will have to admit that the variations in our individual yields are too great.

My idea of the work of the agricultural department is to

develop consistency in the work, and I have no excuse to offer for as large a per centage of low tonnage crops as we have today. It is important that we learn the feeding game, and to be able to inform the farmer on the probable cost of producing a pound of pork, beef, or mutton with feeds at a given price, and how you arrive at the result. In order to know this you must know the relative value of feeds at our command, and how to balance the ration. As far as fertilizer is concerned, barnyard manure is the only practical one that we know anything about, and I think it is our duty to help encourage commercial feeding on the farm.

Bring the end man out of the kinks, and the field man who can help the perpetual eight-ton grower up to the average has done something worth while. I think the fertility of the soil and conditions generally are such that we ought to expect better than fourteen tons average throughout Northern Colorado.

The big unfinished problem in mv mind is how to treat the soil, the preparation of the seed beds and the planting of seed, and I think I am safe in the statement that more than fifty per cent of our poor stands are due to improper seed beds and improper seeding, rather than to frost, wind and cut-worms.

We have started an Educational association that should bring our work up to the highest point of efficiency if we give it the proper attention. We began at zero and the dial hasn't moved. Let's get busy. Results are what we want.

Regarding Cholera

H. H. Simpson, County Agriculturist

During the next two months farmers should take every precaution against the breaking out and spreading of hog cholera. Conditions are usually good for an outbreak at this time because of the hot weather and the polluted water in some of the ditches and ponds. I know of two

cases in the county at present and possibly there are some others that I have not heard about.

This is a busy time and often we neglect to give our hogs proper attention and do not watch them close enough As a result cholera very often breaks out, the entire herd becomes exposed, and the place infected before we realize there is anything wrong. Now is the time to see that your hogs have plenty of shade, good grazing and plenty of clean, pure water to drink. Watch that irrigation ditch and unless you know there is no diseased herd above, you can hold a splendid insurance policy at little cost by fencing the hogs away.

Good farm management means that the work must be well organized and no one should get so busy at one thing that he neglects other important branches of the farm. Unfortunately, or fortunately, whichever you please, hogs do not adapt themselves, with profit, to the habit of being well cared for during the farmer's more spare times and shifting for themselves during the busy times. A little time spent twice each day looking over the herd when you feed them may mean a great deal even at this busy season. Each animal should be made to answer roll call before getting his rations.

Usually the first indication of cholera in a herd is one or two of the animals going off feed, hunting a cool, shady place, and otherwise acting feverish. The skin in the arm pits, flanks, and under belly usually shows a reddish or purplish color and after a day or so the animal becomes partially paralyzed in hind legs, or both hind and front legs. Every farmer keeping hogs should get a small fever thermometer and take the temperature of any hog he sees off feed, and acting feverish. Usually the small pigs will contract cholera before the sows and older hogs, but this may not be so. Do not think because your hogs do not show all the symptoms that you have heard of in connection with cholera, that it is not cholera but something else, for very few animals show all the typical symptoms.

In case your herd becomes infected, we most earnestly advise vaccination with serum. Do not spend any money on any of the so-called cholera cures.

Pulp Distribution for 1915

N. R. McCreery

The time of the year has again come when many of our growers are beginning to ask as to the pulp prices, allotments, etc. As to prices, there will be no change from that of last year, namely, 50c per ton for the first thirty days of the campaign and 75c per ton there after.

As we announced previously, however, there should be a very great difference in the condition of the pulp and the conditions under which the pulp will be delivered to you, owing to the new silo that is being constructed and the repairs that are being made on the old one. This should mean that we can store at least double the amount of pulp we have stored heretofore, and that you will have to haul a correspondingly less amount during the campaign.

We are under the impression that during the past year the pulp distribution worked out quite satisfactorily, and yet with all the work we have done to make the distribution fair and equitable between growers, there are a goodly number of feeders who have gone to considerable length to get pulp to which they are not entitled, and the getting of which robs other feeders of their just proportion.

It is this condition that has brought to our minds the plan that in the future an absolute pro-rata acreage distribution will be abandoned. This was to a certain extent made void last year by the combinations which were allowed, a man with a small acreage being allowed to get some other pulp to make up sufficient quantity to feed at least two carloads of cattle.

The suggestions we have in mind for the coming season are as follows:

That absolutely no combinations of any kind will be allowed. If two or more growers intend to feed together their applications will have to be made together, and after the pulp is allotted we will not allow any trading of any kind. Any trading or any effort to dispose of one's pulp

renders the allotment void. We will not make any definite allotment of tons per acre, but to those feeders who have been feeding regularly for the past few years we will make an allotment of a certain tonnage of pulp which in our judgment will enable them to continue their feeding operations. The acreage grown will to a certain extent be taken into consideration in all these calculations, but will not be the sole basis of the allotment.

In order to eliminate this trading of pulp, any grower who has not fed any pulp in the past will be allowed an allotment for the coming year only when we are convinced that he intends to use the pulp himself, and is not asking for it for trading purposes. Any grower to whom an allotment is made will have the privilege of feeding his pulp at any place he may see fit, so long as he feeds his own cattle. Any outside feeder must feed the pulp on the farm on which the beets are grown, the same as in past years.

We are unable to say at this time what per cent of pulp we will require hauled out during any particular period of time. We will use our best efforts to make these quantities and dates to suit the best interests of the grower, but it must be understood that, should we call for any certain per cent to be hauled, that the feeder must comply with this request or lose a portion of his pulp.

You will find enclosed with this booklet a self-addressed application card, which kindly fill out, sign and return to us not later than September 1st. After that date we will notify you further regarding the quantity of pulp we will be in position to furnish you.

It is not our intention to furnish printed lists of the allotments as we have done in the past. We believe that these simplified rules will work out so that trading in pulp will be largely eliminated, and that bona-fide legitimate feeders will be taken care of without being put to the inconvenience they have been put to in the past few years. We also believe that the new facilities for the loading and handling of the pulp at the factory will do away with the congestion of teams, and will make the feeding of pulp a much more pleasant and profitable occupation than it has been during the past two years.

Boulder County Fair

C. L. Hover

The first Boulder County Fair is to be held in Longmont this fall, September 7th, 8th, 9th and 10th, and we must all put our shoulders to the wheel and make a grand success of this first effort. The fair is primarily for the benefit of the farming interests and unless the farmers of the county very generally exhibit their stock and grains, grasses, fruits, vegetables, and the women their pantry stores, needle work, flowers and babies, the fair will not accomplish the purpose for which it is intended. Only will we ourselves obtain the benefit fairs are intended to give and only will the outside world know what our agricultural resources really are, when we take interest enough to contribute liberally to the exhibits as indicated by the premium list. All this means some work and trouble but is it not the case always, that things that are worth while are things that require labor, forethought and attention? The farmer's enjoyment and the profit he obtains from a visit to the fair depends upon the extent and selection of the exhibits and how are these things to be secured unless every one of us does a little work in the way of collecting exhibits and bringing them to the fair. So let's all go out in the fields and orchards and gardens and collect the best we have for this fair.

It is with great regret that the fair authorities are obliged to delay the distribution of the premium lists, but these will be ready to mail out about the time this issue of Through the Leaves reaches you. If you do not promptly receive a list, kindly call up the secretary, Mr. D. W. Thomas, Phone Ogden 9 and he will see that you get one. Those desiring a copy of the bulletin recently issued by the Agricultural College on "Preparation of Agricultural Exhibits" can obtain same by applying to County Agent Simpson. Exhibitors will find these bulletins very helpful.

In collecting grain in sheath, the best time is while the grain is in the dough, cutting the straw as near the ground

as possible so that the full length of the straw will show. Hang these samples in a dark, cool place to dry and in this way the straw will toughen and retain its clear color. Threshed grain can be brought in any handy container as the fair will furnish exhibit containers in order that all exhibits in threshed grains may be shown in uniform packages. Treat grasses and alfalfa as you do grain in the sheath and you will find that the samples will be much more presentable.

Farmers can be of great assistance to the committees if they will but take the trouble to report to the secretary of the Fair Association any one who has especially good produce of any kind or stock that is above the average. Don't withhold information of this kind but remember that everytime you go out of your way a little to help the fair you are adding a little to its effectiveness and its attractiveness. The Fair organization desires to call the attention of county farm associations to the prize offered such associations for the best farm exhibit. This prize is a fifty dollar silver cup and must be won three times by the same association before it becomes the permanent property of such association. It is to be hoped that good healthy rivalry will be created among our county associations to permanently win this cup. In making up the premium list the committees were guided by the desire to make of our fair a constructive force for the permanent development of agriculture in Boulder county and therefore only the things that can be grown in our district and are or can be made of commercial worth, were included in the premium list. The fair will not give encouragement to the growing of worthless varieties and will only place new items on the premium list when it has been demonstrated that such items are of commercial value and are adapted to our conditions.

Prize winners in agricultural products, fruits, etc., will be sent to the Colorado State Fair and then to the International Dry Farming Congress. For any information desired relative to exhibits, call up the secretary, phone Ogden 9, and he will gladly answer your questions.

Begin now to get your exhibits ready; it is not too soon.

Tractor May Help Beet Growers

C. A. Bradley

Chula Vista, California, June 26, 1915.

I had expected to have visited several of the sugar factories which are within a hundred miles of here and been able to report on what they are doing and how soon they expect to get to making sugar. I am sure, however, that they will soon begin and from all I could see from the car window the crop is up to average.

I had expected to give you some of the different things that might be of interest to you in the way of any method the California growers have that would be of benefit to your Colorado growers but have not taken the time to get the matter necessary for the article, but hope to do so before the next planting time in Colorado.

The great thing in handling a crop where the price per hundred pounds is so very low, and the tonnage is great, the one very important problem is, how can I handle the great weight of this cheap tonnage crop so that it will be more profitable? If a man has never tried hauling sugar beets he does not know the burden of handling this crop by hand. If the field is within a reasonable distance of the dump, and he is using four good horses and the field is reasonably solid, he will be expected to handle four loads of four tons each, shoveling them one way at least, and if the crop is being delivered in silo at a dump he will have to shovel the loads two ways, making the handling of sixteen tons of beets twice. If he has never had any experience of this kind, he will at least have some sympathy for the beet grower, and will be ready to go to bed when he has finished what will be expected of him for a

day's work. The sugar beet crop is a heavy crop to handle in every way, the plowing must be deep and thorough, the cultivation must be deep as possible the first time over, for if it is not done that way we find that the second time we try to cultivate, it is almost impossible to go down deeper than the first cultivating. The pulling is heavy work and if the season is not dry the dragging of a great load of beets out of a soft field is heart-breaking work on your teams. I believe the preparing of the ground, the planting, cultivation, and tending of the sugar beet is well understood and the next step is to find some great saving in the pulling and hauling the crop to the dump.

I have been very much excited the last month over the new farm tractor that Mr. Ford, the auto manufacturer is said to be getting ready for market. It is said that he will put on the market this fall a farm tractor that will do the work of six horses, that will handle easily a gang of two sixteen-inch plows, and will do other work accordingly, that the price of this tractor is two hundred fifty dollars, or the price of one good mule.

If this be true I can see a great light ahead for the beet grower. This little tractor would be able to handle the beet puller and would also be able to handle a large wagon out of almost any ordinary field with five or six tons of beets, and the same tractor could be used to pull the beets and draw them to the dump, and it is not a small item when beets are grown in dry climates like Colorado, to get the beets to the dump just as soon as possible after pulling, for we have to get back to the same problem, a great number of pounds to be handled many times and the gross price of which is less than six dollars for two thousand pounds. Here is hoping that Mr. Ford is doing that thing, and will have them ready for delivery before you will need to handle the crop of 1916. I trust I may be able to give you some information after visiting the fields and factories of California.

Yours very respectfully,

C. A. BRADLEY.

Some Diseases of the Beet Commonly Called "Black Root"

H. H. Griffin, Agr. Supt. Fort Collins Factory

Since the inception of beet growing in this country, the root has been affected by what is commonly termed "Black Root." This is a blackened condition of the outer layer of the root or hypocotyl, but does not affect the proper functions of the plant. In fact this trouble was noticeable only when the beet was pulled from the ground, but generally occurs on the early beets, and is caused, no doubt, by the wet, cool conditions of the early spring, as it is seldom noticeable after the weather becomes warm. But the beet, like other crops, is sooner or later subject to insect attacks and diseases.

We now have some additional troubles of the seedling beet root, which from form and apearance are commonly termed Black Root. The term Damping Off is also applied by some to this condition because of the rapid manner in which some stands of young beets disappear, either wholly or in part. The botanical department of the college, for six or seven years past, has made microscopical examinations of this trouble for us, and these examinations at first showed the fungus rhizoctonia to be present, while those of recent years have shown the fungus phoma to be the cause of some of these troubles.

A report from the Journal of Agricultural Research, U. S. Department of Agriculture, by H. A. Edson, entitled, "Seedling Diseases of Sugar Beets and Their Relation to Root Rot and Crown Rot," gives us in very concise form the results of many experiments, which substantiate in detail many of the conditions which we find in practice to be prevalent and bear out many thoughts expressed in regard to these diseases of the beet, during our experience of the last few years.

It is not our intention in this paper to go fully into all details regarding the appearance of these troubles, for most of the growers are perfectly familiar with them.

About six or seven years ago a disease became notice-

able upon most alfalfa fields that were broken and planted to beets. This trouble became so general on alfalfa fields planted to beets, that we have for the past six or seven years, discouraged any of our growers putting beets on alfalfa sod. Sometimes the trouble did not occur, but the risk was too great to be taken, in our estimation, especially since alfalfa land is so expensive to prepare for a beet crop. These beets would start growing nicely in the spring, but often when the plants were about the size of a pencil, the leaves would commence to blacken and die. An examination of the root would show the crown discolored, and the roots would soon become blackened in patches. Many of the roots would rot, often completely, and the whole field would return but a slight yield and very poor beets.

Oftentimes this disease would manifest itself in the very young seedlings to such an extent as to destroy the stand. This will occur on lands other than alalfa sod when once the soil becomes infected.

Soil properties enter largely into the susceptibility of the crop being affected. It is quite evident that clay soils devoid of organic matter, and that consequently bake readily, are the most easily affected. In fact, some fields may be quite free of the disease, except in small areas scattered here and there over the field, which are commonly called clay spots. Oftentimes nearly all the beets on these spots will die, while the remainder of the field will remain fairly healthy. In certain types of soil, we have known this trouble to occur from year to year in exactly the same spots of the field. We have also had some fields in which a change of crops was compelled by this trouble, after the farmers had suffered an almost total loss of crop for two or three years. In fact some fields in which the first planting failed to grow have been replanted and failed in the same way, thus showing that the warming of the soil did not improve conditions.

Edson says that soil properties are potent factors in influencing the susceptibility of beets to attack by rhizoctonia. That soils of such a texture as to bake readily are more liable to develop the disease. However, he further states that experiments lead to the conclusion that in the case of rhizoctonia, root rot of the beet, soil temperature

is a more important factor than soil texture. That baking has a potent influence in increasing both diseases which I mention is also borne out by pot experiments that have been conducted in Germany. As far as my observations go, this trouble occurs only on lands that have been recently plowed out of alfalfa, and in most every case on land that has been occupied with the plants for many years.

New seedlings (three or four years old) do not seem to have this trouble. When once this disease is prevalent in the field, our experience has shown that rotation must be given. Such fields should be planted to some other crop, and preferably one that will add much organic matter, before planting it to beets. That climatic conditions also have a considerable controlling influence is evidenced by one field of beets the writer has had under observation. This field was very much injured for two seasons, but the following season, climatic conditions seem to have been favorable and the planting escaped any appreciable injury, but again the following year the field was so severely attacked that the crop was almost ruined, and the field had to be abandoned for beets.

The damp, cool conditions of 1915 have favored the health of the small seedlings. In other words, Black Root due to rhizoctonia, has not been nearly so prevalent.

The disease due to phoma, appears in many respects the same as the above mentioned. It is often characterized by the young beets disappearing, and an examination shows the young root constricted below the surface as though something had been tied around it, cutting off communication between the leaf and the lower root. Quite often the lower root becomes blackened, shriveled and dies, and a good stand may gradually wilt away, until but little remains of it. Sometimes if favorable conditions prevail, new roots will be thrown out sufficiently for the plants to recover and make a crop, but the mature beets will be affected more or less with the rot, which injures their quality.

According to Edson, often 75% of the beets attacked throw off the disease enough to make a good growth, by carrying the fungi on the crown, which may later in the season develop on the root as black rot, or on the leaf

portion where it causes a spot disease, and becomes particularly troublesome to beets kept in storage. They are sometimes put away apparently healthy, but may be attacked with the disease, especially in the crown, and often the whole root may be destroyed. The writer has in mind one field in particular, from which he has taken samples for determination by the botanical department of the Agricultural College, that has been completely destroyed for two years in succession, while the plants were very small, but in which no fault was to be found in the cultural methods, or the tilth of the soil. This field was replanted in 1914, and the replant was taken in a similar manner to the early planting. One significant fact in connection with this field is that one corner containing considerable alkali was not affected, nor was a portion around the edge of the field used as a turning row. The only way I account for this is at the time of infection, this portion was not planted, or that at the time the field was broken from alfalfa, no plants were growing along the outer edge.

Edson says that applications of lime on certain types of acid soil results in almost complete control. He further states that soil from Kansas having had generous applications of factory waste lime developed the fungus, so that the lime would seem to be effective only in case of acid soils. The effect of the alkali above mentioned seems to corroborate this experience.

Edson further says that the type of disease produced upon the beet seedlings by these two fungi are very similar, but that the former one attacks at the earlier stage. Our experience does not bear out this statement, as the examinations made have shown the very young seedlings attacked by both fungi. He further says that rhizoctonia may attack at various stages of the beet growth, which fact is borne out by experience in this vicinity.

To summarize:

That from examination by the botanical department of the Agricultural College, for a number of years, we conclude that the trouble commonly called Black Root, which is so persistent, and a serious cause of loss to our farmers, is due to one or both of the fungi mentioned. The former one seems to be the more prevalent, and probably exists

here, but the latter no doubt can be attributed to some foreign source.

That these troubles are more apt to occur on clay soils that bake rapidly, and that tilth and climatic condition are both controlling factors, but when once either of these diseases appear, the land should be rotated.

That lands that have been in alfalfa for many years should not be planted at once to beets.

That storage of beets from fields where this trouble occurs is attended with much difficulty.

Irrigation of Sugar Beets

Asa C. Maxson

While the following may not convey anything new to those growers of sugar beets who have grown this crop for several years, still we always have a few to whom the crop is new and these remarks are especially meant for such.

There are very few years that we have water enough to apply to our beets to produce the best results so that we need not be afraid of overdoing the irrigating if we do not apply too much at one time. What is too much will depend upon the soil and so each grower will have to determine this point for himself. Sandy soils or soils underlain with sand or gravel cannot stand as heavy irrigation as heavier soils or those underlain with clay.

Often times the end of a field next to the lateral is over wet because too small a head of water is used. The longer the rows and the flatter the ground the larger the head required. Steep ground does not take water as fast as flat ground. For this reason a smaller head running longer should be used on such ground. If too large a head is used on steep ground the waste water will be large and the washing of the field more.

Beets will need watering as soon as they show that

the soil is becoming dry, by wilting. Remember that a wilted beet is not growing. Late planted beets are apt to require water earlier than early planted ones because their root systems are not developed in the lower and wetter layers of soil but are in the upper, dryer and warmer layers.

If the water requirements of the beet mean anything the first irrigation can be lighter than the second or third, but once the water has been applied and the growth becomes rapid as a result the beets must be kept wet until laid by for the season. When this will be, will depend upon the time you wish to harvest. Watering just long enough before harvest to make digging easy should be practiced if possible. The average beet crop will require more water during August than in July or September. The Utah Experiment Station found that the loss of water from the soil of a beet field for 10 days in July was 0.25 acres inch. For the same length of time in August, it was 0.30 acres inch and for 15 days in Sept. the loss was 0.20 acre inch. The fact that some of this difference is due to weather conditions does not alter the effect. If more water is lost by direct evaporation in August than in July or September it means that more water will be required during this month to supply the beet with what it needs.

Flooding of beets is apt to result in root rots which will reduce your yield. If beets are allowed to suffer during the early part of the season and are then given water which will cause a rapid growth your beets will be poorer in sugar than if watered earlier and in most cases will be poorer in tonnage. On the other hand if you use your water earlier and the beets have to go dry during the latter part of the season a good sugar content will be the result. For the best results in both sugar and tonnage beets must be kept constantly wet enough to allow of a constant growth during the whole growing season. Anything which checks the growth means a loss and usually lack of water is the most frequent cause of checked growth. Beets allowed to suffer for water are more apt to become diseased than those which do not suffer.

Loss in Beet Yields

From "U. S. Agr. Dept. Weekly News Letter"

Variations in the yield of sugar beets under apparentl similar conditions are so striking that the department ha recently conducted an investigation into the causes fo these differences. The yield of sugar beets per acre i the United States is lower, with the exception of Russi than that of any of the other beet-producing countrie In Germany, the average is 14.84 tons; in Russia, 8.93; an in the United States, 10.17. Climatic conditions, th character of the soil, and the relative cost of labor an land which prevents as much work being spent on eac acre as is done in Europe, account, of course, for muc of the difference in yield. But even when no such fac tors have to be taken into consideration, in the same lo calities, on soil of the same character, under cultura methods that appear identical, there is the widest rang in the yield. It is no uncommon thing to find one farme hauling 20 tons of beets from each acre to the factory whe his neighbor can barely muster 7 or 8.

The department's investigations into this problem which are published in Department Bulletin No. 238, wer carried on in Utah for a period of 3 years. The investi gators reached the conclusion that the variations in yiel were due to deficiencies of stand. Previous investigation had shown that the ideal stand for sugar beets may b taken as 39,200 plants per acre---the result of leaving beet 8 inches apart in rows 20 inches apart. A larger stan than this under ordinary conditions causes overcrowding a smaller stand means waste of land. It was found, how ever that without actually counting the plants, it was im possible to distinguish between stands of 50, 60, or 80 pe cent of this standard.

The loss occurred in the germination stand before thin ning, during the process of thinning and blocking, and dur ing the cultural operations between thinning and harvest ing. In the department's experiment, it was found tha the germination stand sustained an average loss of close

to 20 per cent. The causes for this may be found in poor preparation of the seed bed, imperfect operation of seed drills, late frosts, the damping-off disease, or the ravages of such pests as flea beetles, cut worms or wireworms.

The greatest single source of loss in the stands, however, was found to be improper thinning. In this country this work is usually done by a poor class of hired labor or else by contract. It is seldom efficiently supervised, and the laborers receive the same pay whether it is properly or improperly done. The investigators found that almost invariably the space left between the plants was greater than the farmer intended it to be, although this fact was not apparent after the plants attained a moderate growth. The average loss from this source was estimated to be approximately 25 per cent.

After thinning there was further loss in the field before the harvest. Some plants were destroyed by the hand hoe, some by the horses, or by carelessness with the cultivator. The total loss from these sources was estimated at an average of approximately 7 per cent. Thus, in the experimental plots, which furnished the data for the investigations, there was a total deficiency of over 50 per cent in the stand, with a corresponding decrease in the yield.

The remedy for this loss appears to be greater care. In particular, the elimination of contract work is recommended since it is hardly possible to expect contract laborers to exercise the proper amount of care and discretion. On one European farm which is worked on scientific principles, 40 cents additional per acre is paid the men if 28,000 beet plants remain in the field after the second cultivation. The beets must be 11 inches apart in the row.

The significance of this investigation in the United States is increased by the fact that it was carried on in a district where the average yield per acre is 17 tons as compared with an average of the entire country of only 10.17. If losses of such size can be found in a region where beet culture is obviously more advanced than in most other regions, the total loss throughout the entire United States must be enormous. This total is to a great extent preventable, for, as has been shown, it is due less to natural conditions than to defects in cultural methods.

An Engine on the Binder

From "Farm Engineering"

One of the most interesting uses to which gasoline engines are now being put on many farms is their application to mowing machines, such as grain binders, to drive the sickle and elevator, leaving the horses nothing to do but pull the binder.

By the use of such an engine, two horses will handle an 8-foot binder in heavy grain without trouble. It is thus a saver of horse flesh.

Besides saving horses, the engine makes it possible to cut lodged or wet grain, which often cannot be done without it. In lodged grain, if the binder becomes clogged, it is only necessary to slow down the team, and the sickle and elevator will clear themselves, as they keep on going as fast as ever, being driven by the engine.

In a wet field, if the bull-wheel slips, it has no effect on the sickle, consequently it does not get clogged. Many a farmer has saved his crop during wet seasons by the use of an engine, when it would have been impossible to cut without it.

Engines used for this purpose are of the light-weight, high-speed, throttle-governed type. Such engines are now being adapted also to a similar use on hay balers and other machines, besides all general farm work.

Another item to be considered in the use of an engine on the binder is that of less wear and tear. The greatest wear on the binder comes from the bull-wheel falling into holes or dead furrows, or when the team jerks ahead, speeding the entire mechanism very suddenly and putting a terrific strain on chains, bearings, castings and reel. With the engine, the power is applied continuously in a smooth, steady stream.

THROUGH THE LEAVES

SEPTEMBER, 1915

New Pulp Silo Under Construction

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You Are Invited

By the Experimental Department of the Great Western Sugar Company, to visit the experiment farm, just east of the Longmont Factory, from 8 to 12 a. m. on the days of the County Fair, Sept. 7, 8, 9.

The following are among the experiments being conducted:

Fertilizer tests
Rotation tests
Irrigation tests
Spacing tests

Those connected with the work will be present to explain the various experiments.

ASA C. MAXSON,
In Charge.

Agricultural Notes

W. P. Hogarty

Before the next issue of this paper you will be harvesting your beet crop, and there are a few points in this connection that I want to bring to your attention. We hope to have the largest tonnage to handle this year in our history, and we must have the crop delivered in perfect condition so the beets will keep until converted into sugar. See that the toppers do their work properly and keep out the trash, and bring your beets to us as soon after digging as possible, so as to eliminate all possibility of their being frozen. We have always tried to be fair in the matter of taking tare, and believe you feel that we have made every effort to obtain this result. The tare taken from the beets received over the dump is as nearly correct as we can make it, but the tare taken at the pile is not correct, but altogether in favor of the farmer, and I want to request of you that you use unusual care in the shoveling of the beets at the pile. All factories have more or less trouble in obtaining the correct results on beets received at the pile, and especially where the territory is heavy clay soil and the beets dirty when received. There are factories that make an arbitrary charge of 2% additional tare where beets are not received over a screen. In Southern Colorado there are factories that take the average light weight of the wagon for three or four days while hauling to the dump previous to piling and with the dirt returned, as is our method, using this light weight as the weight of the wagon from the pile. This would mean an average light weight of the wagon of 250 to 300 lbs. more than in our system. In other words your wagons from the dump with the dirt returned weigh on the average of 250 to 300 lbs. more than they do when you return from the pile, with no larger tare from the pile. Now if you will figure say, 100,000

tons of beets piled, and an average load of say 3 tons, which is high, and a loss to this company of 300 lbs. to the load at the average price for beets, it will tell the story. Now we do not wish to stoop to any arbitrary methods, and if you will properly instruct your help we will get along as we have in the past. Go up to the tare room occasionally and see how we arrive at the proper tare. We invite the most rigid inspection of any and all of the work in connection with the receiving of your crop. Do not ever go on our scales with the feeling that you are not receiving the right weight for your product. Either know that you are or are not. Weigh on ony other scales for a check, only be sure that the other scales are right. Report any misconduct of our employees, and we will try to do our part to make the harvesting and delivery of the crop a pleasure.

+ + + +

We have a world of fertilizer in our feed lots and if you are within hauling distance of the factory and will set a week that you would like to haul the fertilizer to your farms, we will furnish a grader and teams to gather it up for you.

+ + + +

Our supply of beet seed for 1916 is such that with 20 lbs. of seed per acre we cannot plant within 40,000 acres of the acreage we have this year, and probably the acreage of 1917 depends altogether upon the success we obtain in growing beet seed next year. Now if you had just a limited amount of seed to distribute to your growers and you wanted to get the maximum amount of sugar from that seed, would you give it to the most successful growers in your district, eliminating the less successful ones regardless of their loyalty to the industry, or would you ask all growers to be particularly careful in the selection of their soil, preparation of their seed bed and planting of their seed? I think the latter way the fairest, and in giving out seed next spring we want to be sure that it is going into the ground in the best possible shape. We hope you have decided at this time where you are going to plant your beets and if you can possibly plow the ground this fall do so. It has been suggested that we only give out

15 lbs. of seed per acre the coming year instead of 20, the rule in past years. If we have a favorable spring and an extra effort is made in preparation I think we can get a good stand of beets from 15 lbs. of seed, which would enable us to plant a larger acreage. I do not know what course we will pursue when taking contracts, but this note will inform you of our seed condition, and any effort made toward a better beet crop will not be lost.

+ + + +

Are we ready for the beet harvest? If not, why? Is the wagon in good shape, tires all set and the beet rack all fixed up? See to it at once. Look up the digger and get it in good order, have the points in good condition and double trees fixed and arrange your work so that when you start to dig you will not have to stop to get ready. See that everything is ready first, it will save lots of trouble and worry.

+ + + +

There is a movement on foot for next year that by the co-operation of the several counties and the Great Western Sugar company there can be 200 miles of good gravel roads made in Northern Colorado during 1916. We do not mean by good roads a highway traversing a state, but the cross roads leading to the main highway and to the receiving stations. The detail of this matter you will hear about later, but we all know what good roads mean when based on tonnage to be hauled. It is less expensive to haul a larger tonnage three miles over a perfect road than a smaller tonnage a short distance over a poor road. Probably the only co-operation asked of the farmer will be in helping to keep this road good, once it is built.

+ + + +

With W. D. Lippett, assistant secretary of the Great Western Sugar company, the agriculturists of Northern Colorado had the privilege of a visit to the Arkansas valley some three weeks ago. The Arkansas valley is fast becoming one of the leading agricultural districts of Colorado, and the improvement in the valley is very marked in the past five years. The class of farmers, as a whole is hardly up to the standard of our Northern Colorado farm-

ers, yet in the best districts the crops are clean, fence line and ditches mowed and give every appearance of goo farming. The climatic conditions of the valley are not a favorable as here, and small grain does not do as well, bu alfalfa, beets, contaloupes, pickles, etc., were growin nicely, and the value of good farming as against poo work was very apparent. Beets generally have to b irrigated up, the second irrigation takes place just afte the thinning and the third just about the time the first ir rigation takes place in Northern Colorado. A great man of the better growers in the valley are fall plowing thei beet ground, and by so doing, conserving their moistur so they are able to germinate their seed without irrigation and, as one man said: **"If I have one acre of land to plo in the spring for beets, I feel that I have not done m duty."**

It might be interesting to know that this man grow 1100 acres of beets. This feeling of the value of fall plowing is quite general, and a great many are turning unde the third cutting of alfalfa now for next year's beet crop The stand of beets generally are better than ours. Th Rocky Ford factory operates several large ranches, and had the pleasure of going over the one adjacent to th factory. This farm comprises about 4500 acres and fiv years ago was largely pasture land. Today it is growin 1100 acres of beets, the best I ever saw in a body; 1142 acres of good grain and 980 acres of alfalfa, the balance o the land is low and used for pasture, but each year mor drains are laid and more acreage brought under cultivation. The greater part of this ranch has been plowed from 12 to 18 inches in depth. The 18-inch plowing is done with a heavy California plow with two engines stationed at the ends of the fields and the plow, operated by a cable and drum. 12-inch plowing is done with a gas tractor and horses. The management is replacing the tractors with horses as fast as possible as they believe the horse is more economical than the engine, with the exception of the cable plows as it is their intention to plow the soil very deep at least once in every eight or ten years. The management tries to keep 50% of their farm horses in brood

mares, in this way the depreciation in stock is offset with the growing stock. This ranch also has about 300 head of brood sows of the Duroc strain. Last year they averaged seven pigs to the litter. They were fattening some 300 head of hogs when I was there and the ration was three pounds of syrup and three pounds of corn, but the young growing pigs are never fed the syrup. They informed me that they could produce pork for 6c a pound or less. Fertilizer is hauled four miles from the feed yards onto this ranch, and with alfalfa showing an actual loss for the past five years, and grain showing just a small profit of about $2.00 per acre, yet this ranch is making money. It is a revelation to see the system under which this farm is operated. The inexpensive but good machine sheds, barns, and houses for the help. Every two weeks the manager of the factory, Mr. Fred Noble, holds a meeting of the farm help in the large living room of the farm house or hotel, you might say, and all join in a discussion of the best methods of doing the several kinds of work being done on the farm at that time, and the work laid out for the next two weeks, and the farm showed results as every branch of the work was right up to the minute. I understand the same management operates an 8,000-acre farm at Lamar, Colo. On this place they have a dairy of 115 cows, which is proving out well.

+ + + +

Construction work on our new pulp silo is progressing very rapidly and we believe September 15th to 20th will see it completed. A photograph is shown on the front page which will give you an idea how it looked August 25th. The farther the work progresses the more we feel that the conditions under which the pulp will be delivered will make the feeding of this by-product a pleasure.

In connection with the new silo and also the old one we are building a good macadam road leading from the main road in to our silos and scales, and also to the molasses scales and tank. This road, it is estimated, will cost us something like $5,000.00, and is made from crushed rock from the Lyons quarries, put on in layers of coarse and fine rock, thoroughly wet and rolled between courses.

This, we hope, will give all feeders a good road at all times and by reason of the larger space for loading wagons the congestion of teams should all be eliminated. Also we trust that all feeders will instruct their help not to overload their wagons so pulp will spill off. The worst thing we have to contend with in our pulp roads is the pulp spilling off and mixing with the top material of the roads. If this can be avoided we believe this new road we are building will give you good service.

+ + + +

NOTICE TO GROWERS

In order to avoid accidents the management of the Great Western Sugar company requests that each wagon going on our dumps be equipped with brakes or the sharpened iron rod dragging at the rear of the wagon.

+ + + +

NOTICE TO PULP FEEDERS

We expect to have heard from all growers who desire to feed pulp this coming year by September 5th, and will then figure up and see how we can distribute our output. We would ask that all who have made applications call at the factory between Sept. 11th and 15th in order that we may talk the matter over and make you an allottment.

+ + + +

HARVEST

As near as we can estimate we will begin our harvest about Sept. 20th to 25th. The indications are that our tonnage is going to be heavy, and that we have a good long campaign ahead of us. The cool, damp weather of August has not been very favorable for making sugar, but we hope September will be better. The few samples we have taken indicate a slightly lower sugar content than the same date a year ago. Not enough though but that favorable weather conditions might make up the deficiency. We would like to ask that you get yourselves and implements of harvest in readiness.

+ + + +

GRASSHOPPERS

We find that the grasshoppers are getting very numerous in almost all of our beet growing territories, and are

doing a great deal of damage to the beets, and also to the alfalfa fields. In the last issue of our booklet you will find a formula of a poison used in killing the locust, which if used as directed, will bring very good results. If nothing has been done up to this time to rid your fields of the pests it seems to be the only method to follow, that is, in your beet fields. I do not favor the method, however, for when you poison the hoppers you poison some of our different birds as well, and we all know that they are some of our best friends when it comes to pest eradicators. The grasshopper generally makes its appearance about the first days of July and become more numerous as the summer wears on, so this is the time that we should try and check them. I was talking with one of our growers who is bothered every year more or less, with the grasshopper on account of having a great deal of sod land, or unbroken land, (which is the home of the hopper) adjoining his farm, and he said he had tried all kinds of poison, but he had not found anything that will beat a hopper dozer. This is an inexpensive, durable easy constructed sheet metal pan on runners. It can be made any length desired. The pan is filled with water on which is poured enough kerosene to cover it with a film.

When starting to cut his second cutting of alfalfa he hitches another team onto his hopper dozer and follows along behind the mower, and as it is drawn over the ground the hoppers jump into the kerosene and are killed.

On the outside of the field he does not catch so many, but when he reaches the center he is rewarded for his labor.

He said, "There may seem to be lots of hoppers left in the field, but I have never failed as yet to get a good crop of third cutting since I started using this catcher."

I think we can all benefit by this man's experience and even now I think a great deal of good can be done by running one of them over our alfalfa fields and around the edges of our beet fields, even though we only destroy a few it means so many less for this year, and countless numbers less for next year.

Outlook For Wheat Crop

J. R. Forsyth

The writer has just returned from an auto trip through Utah, Idaho and western Colorado, covering about twenty seven hundred miles. We followed the Lincoln Highway through Wyoming to Salt Lake City. There is much to be done for the improvement of these roads, as they are now very rough for long stretches. We returned by way of the Rainbow route and, with few exceptions, had good roads and easy grades.

We passed through the principal wheat fields of Utah and Idaho, and found a large acreage and splendid crops. West of the mountains it has been warm and dry for the last few months, ideal weather for harvesting wheat. The wheat yields are heavy, some dry land producing forty five and fifty bushels per acre. From all reports we get the same condition exists all over the West and Northwest. The Northwestern Miller states that Minnesota and the Dakotas will have three hundred million bushels of wheat of the finest quality. In the East the wheat has been damaged somewhat by the hot weather.

This article is not written for the purpose of inducing anyone to sell or to hold back his wheat, but because some may be interested in conditions as we found them.

Germany's Food Supplies

From "Modern Miller"

As the allies lay great stress on their program of starving Germany, the Chicago Tribune correspondent in Germany, Mr. Henry J. Reilly, made an investigation of conditions there and has made his report, which shows what extraordinary efforts Germany made to raise crops, and the methods to conserve food where there was any concern of future scarcity. Nowhere could such co-operation

be secured outside of Germany. Method and co-operation was accepted as a matter of course and adopted without any strained effort. Mr. Reilly says that the war will be over long before any starvation program can have any effect on Germany. He says: "Throughout Germany the waste land has been improved and vast tracts reclaimed. All these have been planted with cereals and fodder and will yield a satisfactory crop. In Germany hundreds of thousands of prisoners of war have aided materially in this work.

"The considerable districts occupied by the German army in Belgium, France, Poland and Courland have yielded large quantities of food supplies. In fact, practically all the German troops in these districts have been fed on the supply found there. All the agricultural soil in these districts has been cultivated to the limit.

"Where necessary the army has supplied horses to do the work. A considerable number of motor plows are also used. Elsewhere in Germany the harvesting machinery mills are working day and night to meet the demand for plows."

Some of the points dwelt upon have been discussed here and in the United Kingdom. As to the condition of the present harvest, a point on which meager information was available, and what information was received was generally from prejudiced information, Mr. Reilly gives the following direct information after specific investigation:

"Probably the most important question was that of having sufficient grain for bread. Prussia raises enough grain not only to feed her own people, but also to aid considerably in the feeding of the people of the smaller federal states. Bavaria, Mecklenburg and Brunswick also raise not only enough for their own people, but also have a surplus.

"For some weeks a short while back there was a dry spell, which caused a little anxiety on the part of some farmers. Since then it has rained enough to insure an average crop. The crops suffered only where the soil is sandy. Even in these places the damage amounts to comparatively little.

"Because of the dry weather there was a fear that there

might be too much rain at harvest time, and as a consequence a good deal of grain spoiled. With the usual German foresight the government arranged places all over the country in which the grain, if harvested while wet could be properly dried and thus prevented from rotting."

That the grain supply is abundantly ample for another year is set forth thus:

"Under the existing war regulations governing the consumption of bread, the amount allowed the population is considerably under the smallest German harvest for a considerable number of years. The harvest of 1914 was somewhat under the average, but in spite of this fact it can now be seen that by the middle of August, when this year's harvest will be ready, Germany will have a surplus of 690,000 tons of grain."

His observations as to the lack of foodstuffs is summed up thus: "Conditions everywhere justify the statement that the effort to starve Germany is futile."

Germany is an example of a nation which can sustain its population on the products of its soil, after years of dependence on the outside world. It is the result of a studied program to make the nation self-supporting.

European nations gave great heed to the subject of food supplies in time of war, and both Great Britain and Germany have apparently carried out their program without evidence of failure.

Timely Suggestions

Windsor Agricultural Department

While we all know that the farmer in all irrigated districts has just about all that can be attended to, to do, and the Northern Colorado district in particular.

However, there are some innovations that will have to be undertaken sooner or later and the wise farmer will be preparing for the same.

A system of rotation should be adopted that will allow of more fall plowing than is now practiced, the working up

of stubble land by discing and plowing, preferably plowing in the fall, will be of great benefit in the eradication of pests, weeds and insects. Grain should be stacked when harvested, costing less than what can be saved in the price between threshing out of the shock and out of the stack, leaving fields clear for farming operations in preparing ground for the following crop. There is always a considerable loss of grain in harvesting the crop, the ground may be harrowed, scattering the grain upon the ground, followed by discing and irrigating, where water is available, In a short time a considerable new growth may be plowed under insuring a much better decomposition of the vegetable growth plowed under and also getting the full benefit of winter action upon the soil, allowing a seed bed to be made ready for planting much earlier and better in the spring. This will be an excellent method of preparing a field for beets where beets are expected to follow grain.

While aware that the great difficulty with fall work is the one year farm lease, most farms are being operated by tenants who do not know until late in the fall or winter if they remain or not. As a remedy for such conditions we offer the suggestion that all leases contain a clause whereby if the tenant must move after having performed fall work in preparation for the ensuing crop, he shall receive stipulated remuneration for work performed and cost of seed if any has been used.

And in view of the fact of the spring wheat meeting with misfortune in the way of rust, as it has for the past few years it is deemed advisable to sow more fall wheat, confining spring sowing grain to oats and barley which also seem to give much better results as nurse crop for alfalfa seeding.

Winter wheat being harvested earlier will give better opportunity for fall preparation of land for the ensuing year.

On alfalfa land that is expected to be planted to beets the following year a third cutting should be irrigated and plowed under. In no other way can an equal amount of good manure be spread upon the ground as cheaply.

Livestock Market Letter

Ben Kemper, Pres. Denver Livestock Com. Co.

Denver, Colo., Aug. 23, 1915.

Everyone is wondering now what the price of feeders will be in October and November, and what the prospects are for feeding cattle this coming winter. At this time it is hard for a person to say just what the conditions will be, as there are so many obstacles in the way. The European war, which we are all so familiar with, is so disastrous that conditions can be changed very easily. We look for a good supply of cattle during the months of October and November. We feel that prices will compare very favorably with last year. If there is any difference we would say the market would be lower on 800 lb. to 1000 lb. steers, but on the other hand we feel that cows will be scarce and desirable kinds will be hard to buy to put in the feed yards.

Conditions on the western slope and in the mountains are far from favorable. The hay crop will not exceel sixty per cent. The winter ranges will be very short, and in fact the country west of the mountains is dryer than it has been in ten years. This, of course, will cause the marketing of quite a few cattle that otherwise would be kept on the range.

Our export demand to the European countries, which opened along in May, has cut quite a figure on fat stuff, but the uncertainties of exporting our beef on account of the present submarine trouble on the English coast makes the future for that very uncertain. If we could export our beef to all the countries involved in this war with certainty, and avoid being hindered in any way, no doubt we would see high priced beef as long as the European war lasts, but with the uncertainties that we have to contend with it is hard to guess.

The conditions in Kansas, Nebraska, Missouri, Iowa and Illinois are far better than they have been in two years. There will be an abundance of rough feed, while the price of corn will be high, but not as high as prevailed last year.

We feel that the feeders in this state will have a little hesitancy in buying cattle at the price they bought them at last year, as they suffered heavy losses in feeding cattle last winter. On the other hand, they will be compelled to buy pretty heavy of light cattle in order to consume their rough feed which they have.

The Army Worm

Asa C. Maxson

The army worm has appeared in great numbers in grain and alfalfa fields during the last few weeks in parts of Northern Colorado. While this worm is always present in our fields it is only when conditions are most favorable that it appears in such numbers as this season. Regarding the conditions which are favorable we have the following statement from Circular No. 4 of the U. S. Department of Agriculture: "In general it may be said that the worms are more apt to make injurious appearance in a rainy spring or early summer following a season of comparative drouth." Just how much the weather conditions of the past and present seasons have had to do with the present occurence of the army worm it is hard to say. The records show that the last half of 1914 was below the normal in rain fall and that the present season is above the normal, so that in a way the conditions mentioned above are met in the sections of Colorado where the worms have appeared.

The army worm when full grown is about 1¼ inches long, The color varies from grayish to almost brown along the center of the back. In some specimens there is a very narrow, broken line in the center of this stripe which is usually more prominent near the head. Along the edges of the dark stripe of the back there is a lighter border followed by a narrow dark line. Below this dark line is a pinkish (in the lighter worms) or reddish stripe not quite half as wide as the stripe on the back. This stripe has a very narrow light line on each edge. Below this reddish stripe is another dark one of about the same width and following it

is a light yellowish stripe which is not quite as wide.

The moth which lays the eggs from which the worms hatch is very like that which produces the cut worms. In this latitude there are probably three broods of worms each year. The moth lays her eggs on grasses and grains usually prefering the heavy growth such as occurs about old stack bottoms or manure piles.

The eggs hatch in about 8 days and after feeding 3 or 4 weeks the worms enter the ground and emerge as moths in 2 weeks more.

When not present in large numbers the worms hide during the day and feed during the evening and on dark, cloudy days, but when very numerous they will be found feeding during the day as well.

This insect passes the winter as a partly grown worm in our latitude but farther south the moths spend the winter in hibernation as well. It is generally one of the later broods which appear in damaging numbers.

If we take advantage of our knowledge of the feeding habits of the worms we can fight them very successfully with the poisoned bran mash made after the following formula:

Bran	20 lbs.
Paris green	1 lb.
Syrup	2 quarts
Water	3½ gallons
Oranges or lemons	3

The bran and Paris green must be mixed dry. Add the syrup and oranges or lemons, after the latter have been very finely cut, to the water and mosten the bran and Paris green with it.

This mixture should be thinly scattered in the path of the moving worms or over a field in which they are feeding. To be effective this must be done about the time the worms are becoming active in the afternoon. This method has been tried by County Agriculturist Simpson with very good results.

In case the worms are leaving a field where it is possible to run a small stream of water across their path they can be checked in this way and then the poisoned bait can be spread along the ditch where the worms are collecting.

The Sugar Beet, the Most Important Crop of the Temperate Zone

From "Sugar at a Glance"

(Ferdinand Knauer, Halle, Germany, 1861; 180 pages. Republished 1876, 1906.)

In his preface Knauer says:

"I am not a theoretical book writer, but a practical farmer and I request my readers to accept my apologies if they find me lacking in theoretical knowledge as regards composition and expression.

"Go out into the world thou first born of my pen and try to convince the readers that it was only love for the cause that made me write my experiences in order to publish to the world at large that thou has been written only because I was impelled to be useful to my fellow men."

"Having indicated the importance of the beet as a desirable cultural plant in the preceeding paragraphs and titles, therefore in the following we will prove how enormously beet culture together with the beet sugar industry, has and will further increase the national wealth of all countries where it has become established.

* * * * * *

"The complete changing of the entire system of agriculture was reserved for the beet germs. The desirability of its culture soon convinced the farmers of all countries who are otherwise hard to approach, that land rents and crops could be increased to an unhoped for height simply by increased beet culture. Though 30 years ago a little over $4.00 annual rent per acre was unknown for the best Prussian lands, nevertheless it is now easy to pay $8.00 or $10.00, according to conditions, per acre, per year, where sugar beets thrive and yield; from which it results that land values and rents have doubled since the introduction of the beet. As a consequence the national wealth of the landlords has nearly doubled. From our point of view

this result must make us enthusiastic regarding the beet, since its value is of such magnitude that it is impossible to express it in figures. If we remember that since beets have been grown the tillage of other agricultural lands has increased very considerably, every thinking man will understand that double the population and two or three times as much stock can easily be supported on the land tilled at present. Though 40 years ago, using fallow land for the 3-crop rotation, the production of 6 scheffels of grain per morgen of plowed land was a great deal for intelligent farmers, now we have instances of estates which while planting one-quarter of their acreage to beets, harvest 10 or 12 scheffels per morgen for their entire area. * * *

"For many years agricultural associations have busied themselves with the question of the advisability of deep culture. While these gentlemen ranged around the green table discussed the question in lively debate, the beet, in all silence and modesty, without discussion, introduced deep culture, since it did not concern itself with such deductions as the presence of sufficient or insufficient fertilizer or the necessary draft power. She simply says, 'Farmer, provide howsoever, but I do not yield in flat soil ---I must have deep culture if I am to grow perfectly, because my mother, nature, drives me downward and I will follow your instruments with my tap root even if you plow three or four feet deep.'

"Thus the beet farmer was forced to burn the old plow which made a furrow only 4 to 6 inches deep, and to secure instruments that would make a furrow bottom, twice, yes, three times as deep.

"The result was surprising, since the old theory about dead soil was literally killed, and treasures, i. e., valuable inorganic soil constituents---were turned to the run and air, which together made these bodies assimilible by the plant by increasing decomposition.

"Thus a rich tilled soil originated, and in a national economic respect it cannot be too highly recommended that all useful soil be cultivated deep before planting.

"When the Lord God had so far completed the earth by means of eruptions and precipitations that a fertile belt, (called 'alluvium') had placed itself around all primary,

secondary and tertiary formations, the Lord God wished that this humus soil be subject to man---i. e., that it should nourish him and his millions of descendants, yes, decently.

"In order that this storeshouse of tillable soil should not be depleted until its enrichment was understood, our Lord God, who made all wisely and good, placed a lot of obstacles into our divine soil itself. The beet must first come. It was reserved to the beet to teach man how to obviate the obstacles and produce a deep tilled soil. Myriads of field stones lie in the northern part of the continent (called erotic blocks) in the alluvium, or, most often, just under it. The shallow plowing and shortsighted farmer avoided these, since they injured and destroyed his plow. However, the beet absolutely demanded deep plowing, since it takes valuable substances from the diluvium---for instance from the marl. There is no other relief, these stones must be removed; and thus by subsoiling and deep plowing a doubly thick tilled soil was created, which is more resistant to all injurious climatic conditions than the flat; thus the plants it grows resists drought and water better. Clearly, considering this incontrovertible truth, the deep culture due to the beet has more than doubled the national wealth in soil.

* * * * * * *

"We have previously demonstrated, by example, how differently a farm pays with beet culture than without. We can prove this statement by hundreds of examples, but hope our readers will be convinced of this statement without this proof. If this should not be the case, the beet districts of Northern Germany give opportunity daily to convince one of the irrefutability of this statement, since the speed with which beet growing estates improved through their increased draft animals and other stock and the resulting fertilizer, is very surprising; other farmers wished to help themselves more easily by applying artificial fertilizers.

* * * * * * *

"Beet culture gives us a medium for producing large quantities of manure in the cheapest way; thus national thanks are due the beet for all the sums no more allowed to go to England and America, which are retained at home

to augment our national wealth, to improve our farms and produce manure. Justus von Liebig's warning: 'Farmers are following out a system of robbery,' is only too well justified and applicable to those farms which solely seek their fortunes in grain with little stock. Even though a farmer fallowed one-fourth his acreage each year, his plowed lands and pastures will become poorer in soil wealth, poorer in humus and mineral substances since every crop takes out potash in the exported grains, superphosphates especially; which valuable and necessary constituents can never be returned to the soil on an extensive grain farm; thus such farms become poorer in soil fertility from year to year. * * * Only on such estates in Saxony as plant a great deal of beets have built a dam to the unceasing process of depletion. J. von Liebig's cry of distress would have died out without any effect if men had not been present who at the first sound, who rightly appreciating the everlasting progressive depletion, sought and found safety from this danger in the progressive increase of barnyard manure production. Beets were the agency of attaining this end cheaply and easily.

* * * * * * *

"Small farmer throw aside the old leaching and demoralizing three-crop system which many of you inherited from your fathers, which entails fallow wintering and summering; reach for the land and horse hoe with decision. Blessing will follow you, for hoed crops give fodder, fodder yields manure, manure yields grain, and grain yields money. * * * * *

"To whom has not been made clear by what has been said, that national wealth is endlessly increased by increased beet culture, since at the beginning of this text we have shown by examples that estates planting one-quarter of their area to beets yet raise considerably more and better grain than from the whole area, this statement will be substantiated by all intelligent beet growers, and thus is proven how much the state should be interested in further beet culture and to protect the northern beet sugar industry, since it produces bread as well as sugar for the population, which has increased one-third in 20 years. * * * *

"Beets and beet sugar industry united abstract theory

and abstract practice. Authorities renowned as chemists devoted themselves to agriculture in the beet industry, and thus agriculture was enriched by scientific power managed by scientists who taught us. * * * *

"This must demonstrate to every farmer that the farm with extensive beet culture increases from year to year in its culture, while the other if not poorer at least does not increase in strength, and so remains stationary. * * *

"The small farmer can only take example from the large one, and since beets are destined to improve agriculture in the easiest manner, all intelligent farmers should join us in teaching our small colleagues how to raise beets, quantities of beets, to advantage. These people will then have fodder therefrom, fertilizer therefrom, much grain, and naturally from this, money and competence. We are not deceived that the cultivated soil of Europe can produce three times as much as at present without losing value itself. Since the more soil a crop produces the richer and more productive it becomes in high culture and fertilizer production. * * * *

"If the government could have known that Europe and the Temperate Zone were destined to become the greatest sugar country of the earth, they would truly have had no cause to encourage emigration to America and Australia; now all the emigrants would be able to secure sufficient daily bread, and it is certain that with the future increase of population, the raising of sugar beets and recovery of sugar therefrom will and must appreciably increase. * *

"No one dreamed that his beet, this sugar in the beet, could be so useful to agriculture and industry as we have seen it. No other cultivated plant would have been able to improve agriculture so greatly as this one, since only by intense cultivation of the soil blessings and yields can be obtained from it. * * * *

"Beet raising forced us to work our soil better, produce new implements, especially plows, which would give even better service than the spade. It taught and gave us a near approach to an ideal rotation---yea, possibly to reach it, since through it we can alternate leaf and stalk crops. And here, since the sugar beet is a very desirable crop to

precede summer grain and legumes, we will again lay down the law that the best preceding crop is the one which best prepares the soil physically for the following crop. * *

"An entirely different spirit permeates the farmers since the introduction of beet culture. The people have since learned that it is better to plow deep and fertilize heavy; that from $30.00 to $45.00 worth of crops can thus be gained from 98 square rods a year, and that $4.50 to $7.50 rent can be paid for good soil without fear of barkruptcy. Further,they have learned that the soil gets poorer and poorer on fallowing with good rotations and a small amount of poor stock. We have already said that beets forced the farmer to adopt rational deep culture and the introduction of garden culture, since it grows and yields only in deeply worked soil, free from weeds, which, by stirring with hand or power hoes, constantly remains subject to the useful influence of the air.

"Thus new life and action arose on field and plain which before had never been equalled. The old German wooden plow with its yard of mold board was burned, and well constructed iron plows took its place; the harrow was imprived, etc. The old destructive German roller which evened the soil like a barn floor was displaced by the desirable ring roller. Farm machinery manufactories grew up, the teaching of chemistry and mechanics were united with practice to accomplish the amelioration, i. e., the better preparation of the soil with the least effort. Thus we see garden culture equaled on our beet fields, yes, even excelled.

"We close our work with the wish that our readers will test all and retain the best, and that those not impressed with beet culture will be incited to busy themselves more with it, to the profit of their farms. Of those further progressed in agriculture than ourselves, we beg mild criticism; may they understand that in writing down our thoughts and experiences we aimed at the general good since it is our firm belief increased beet culture is the greatest blessing for every land. * * * *"

Feeding Hogs

Geo. Knutson.

There is no class of live stock raised for commercial purposes that receives as little attention as does the hog on the average farm. The hog's food is never measured or given any attention except when his stomach gets so empty that we hear the echo of the "stomach rumble" in the form of the proverbial squeal. To allow this is not producing pork economically. We used to think that if we could rear the stock to maturity regardless of condition that we were ahead of the game. Today we know better than that. We cannot produce growth or gain as cheaply by allowing a period of stagnation in the growth which ultimately stunts the individual and is sure to produce a runt, as by forcing the growth from birth to maturity. Then, too, when the hogs are to be conditioned there is the additional cost of bringing them back to a growing, thriving condition.

We must admit that the hog is a scavenger and will eat anything that is put before him, either raw or cooked, wholesome or unwholesome, fresh or rotten, clean or filthy. Yet why should we permit ourselves to allow the hog to follow his natural inclinations in these things. If we kept them away from filth the hogs would do better and the meat would be more wholesome than under other circumstances. I have seen good farmers throw carcasses of the various farm animals in to the pigs for their consumption. This is not in accordance with the latest hygenic or pathological principles. Don't do it! It may be all right for the feeder, but it is not fair to the consumer.

In order to feed a hog intelligently it is necessary to know what the approximate requirements are for body maintenance and also for the production and for 100 lbs. of live weight.

The following table will show what feed is required to maintain a pig at different weights:

Standard Weights		Corn Meal	Wheat Middlings	Skim Milk	Water
When weighing	50 lbs.	0.15	0.15	1.2	2.3
When weighing	100 lbs.	0.40	0.40	1.6	2.0
When weighing	150 lbs.	0.80	0.80	1.6	3.0
When weighing	200 lbs.	0.67	1.33		6.5

Food of gain and food of support of the pig:

		Av. Daily Gain	Dry Matter for 100 lbs gain	Per Cent of Food To Support Body	Per Cent of Food For Gain
When pig weighed	50 lbs.	0.93	224	18	82
When pig weighed	100 lbs.	1.66	208	25	75
When pig weighed	150 lbs.	1.85	312	27	73
When pig weighed	200 lbs.	1.22	396	36	64

From the above table it is obvious that young animals are the most economical to feed.

The following table is also very interesting in that it shows where the cheapest gain is in pork production.

The relation of weight of pigs to feed consumed and rate of gain.

Wt. of Pig	Actual Av. Weight	No. Animals Fed	Av. feed per day	Eaten daily for 100 lbs. live wt.	Av. Gain per day	Feed 100 lbs. gain
15- 50	38	174	2.2	6.0	0.8	293
50-100	78	417	3.4	4.3	0.8	400
100-150	128	495	4.8	3.8	1.1	437
150-200	174	489	5.9	3.5	1.2	482
200-250	226	300	6.6	2.9	1.3	498
250-300	271	223	7.4	2.7	1.5	511
300-350	320	105	7.5	2.4	1.4	535

In studying the above table it will be found that young, or about 50-pound pigs, consume about 6 pounds while the larger pigs consume but 2.4 per 100 pounds of live weight. The gain starts at 0.8 lbs. and increases until the 250 lb. class is reached where the gain rises to the maximum of 1.5 lbs. in one day. The economy of feeding the younger pigs is shown in the foregoing tables, and they should be carefully studied by the hog feeder.

The question that confronts us next is what kind of foods shall we feed. Every farm in Northern Colorado is a hog farm and it is too bad that this is not more fully

recognized in general. There is not a farm that cannot raise one or more of the foods that are suitable for pork production, such as corn, alfalfa, barley, oats, roots, etc.

The shriveled grain which the farmer is often at a loss to know how to use at the best advantage can be ground and mixed with any other grain and made into a most excellent hog feed. Greater value is derived in mixing it with other grain than if fed alone. One of our farmers raked his wheat field and got 90 bushels of wheat from one day's raking. This grain if not in a fit condition to save, could have been fed in the straw to the pigs and a great deal gotten out of it in this way. In fact, wherever grain is lodged so that the binder or mower will not cut it, some effort should be made to recover it from the field either by raking or direct pasturing. When a boy it was my task to herd the hogs over the places the binder could not cut and we found that it paid where 25 or more hogs could be kept in a drove. When feeding stuffs are as high as they are now, in my mind, these are things worth considering.

Corn is the most universally used food in the pork producing sections of the United States and hence we will consider it first in the production of pork. Every farmer should aim to have at least a small patch of corn that he can turn his hogs into in the fall when the alfalfa pasture gets low and the period of fattening should begin. There is no cheaper hog feed than corn just beginning to ripen and harvested by the pigs themselves. With a system of hurdle fences so that the pigs are not allowed to ruin the field but made to clean it up as they go along, this is the most efficient system and produces the maximum amount of pork at the minimum of expense. Where foraging the corn off can not be practiced the corn can be cut and carted to the hog pen at each feeding time. The cost of cutting and carting will have to be added to the expense of feeding the pigs as this has no advantage over the hogging off system. The corn foraged from the field is worth nearly one-third more than ear corn in feeding value. The waste in hogging the corn off is no greater than it is in feeding ear corn. The value of the crop can be increased if a small amount of rape is sown in the field at the time of the last

cultivation. Soft corn has a good feeding value if fed before it sours. When the corn is once dry it should not be removed from the ear when being fed. Grinding, shelling soaking and all other operations are of little value and have not been found to pay.

Barley has long been one of the leading hog feeds in Europe and America. Nearly all of the pork produced in Europe is the result of feeding barley in combination with other feeds. Barley should never be fed alone, but in combination with corn, wheat, oats, peac or mill stuffs, as it has 10% less feeding value than corn. It should be cracked and rolled before feeding.

Oats are not suitable for hog feed due to the large amount of dry indigestible matter. When oats are to be fed to pigs they should have the hulls seived out. Oats are a great bone and muscle producer and are good for pigs, colts and calves alike. Oats can be fed in small quantities to the hogs with fairly good results by scattering it over the feeding floor.

Very few realize the value of the pigeon grass seed as a hog food. If this is ground and cooked the pigs will take to it a little better than any of the other grains. It should be mixed with some other grain, however, in order to be properly digested.

Roots, pumpkins, etc., are all in the same class in that they are succulent foods. They are largely conditioners except where fed in large quantities. Sugar beets, on the other hand are valuable for their fattening qualities and can be used very liberally in the feeding lot. The flesh produced from them is inclined to be watery and may not keep as well as made from the corn or some of the other cereals. Any root is valuable for feed in the winter months when so much dry food is fed as it keeps the intestinal tract in the very best condition.

The value of alfalfa pasture is so well understood and has proven so successful that I need not discuss it in this article. To those that are not familiar with its worth I will refer them to their nearest neighbor.

Mill stuffs are not referred to because I think that a farmer that is going into the pig business or is in the business should aim to raise all the hog feed that he needs.

Milled foods are expensive and I doubt if a hog can be fattened with any profit with their use.

Important things in the feeding of the hog are that he has the proper exercise, a clean, warm place to sleep, plenty of fresh water, and the proper breeding.

Note: The tables were taken from Henry's Feeds and Feeding.

The Value of Shrunken Wheat for Feeding

H. H. Simpson

Various estimates have been made on the reduced yields of spring wheat as a result of the rust, but whatever the exact damage done, it is very disappointing to say the least, after such a bright outlook during the early part of the season. The variation in the quality is great and while some of it will test out pretty well, there are other fields that will hardly be marketable or if so, at a very low price. Where the wheat is badly shrunken and the price offered very much below the market price, greater returns will be received if held and fed to stock. With wheat that grades up an average quality the price is usually too high to use for feeding when other grains can be purchased at a less figure. For this reason little is fed to live stock and few farmers know the feeding value of this crop.

A comparison of the digestible nutrients of wheat and corn shows the latter to be somewhat superior, or the relative value to be about 93 pounds of corn, equal to 100 pounds of wheat. The following is a corparative analysis:

	Protein	Carbohydrates	Fats
Corn	7.8	66.8	4.3
Wheat	8.8	67.5	1.5

According to the Armsby feeding standard, corn has a net energy value of 88.84 therms and wheat 82.63 therms Now of course this is theoretical, but strange as it may seem, practical feeding experiments bear out this relation

very well. However, practice also shows a great variation in the results obtained from wheat when fed to different kinds of animals and when fed alone and with other grains as substitutes. Wheat, like silage, may prove disappointing, unless one knows when and how to feed it for best results.

Looking at the above analysis we see that it carries slightly more corbohydrates in the form of starch, more crude protein and much less fat, than corn. It also has somewhat more phosphorus and potash, and is therefore superior to corn for building bone and muscle in young and growing animals. Because of its sticky nature, wheat often does not give satisfactory results when fed alone and may be considered as being about 10 per cent below corn when fed to fattening steers, lambs and mature hogs. However, when mixed with corn, barley or oats, the combination is usually superior to any one of them when fed alone. The writer has fed wheat in a great many ways to work horses and found it to be very satisfactory if ground and mixed with ground barley, oats or bran. It is very laxative and when fed alone with alfalfa hay will not keep horses in good condition for work.

As a feed wheat probably has a relatively higher feeding value when fed to fattening shoats than any other kind of live stock. At the New Mexico Experiment Station the writer produced gain on shoats with soaked wheat and alfalfa hay for $4.79 per 100 pounds; with ground wheat and alfalfa for $4.55; and with ground wheat, skim milk and alfalfa for $5.25. The wheat used was of a low grade and shrunken. Experiments at Ohio, South Dakota, Kansas and Wisconsin all show that wheat and corn are about equal for producing pork.

Ground wheat, barley and cottonseed meal make one of the best rations that can be fed to dairy cows for milk production, and here again it will replace corn pound for pound.

Steers and lambs have not given such good returns on wheat, and practice proves that although it is valuable grain to produce growth, it is considerably below corn for finishing these two classes. In North Dakota where shrunken wheat that was rejected at the mills was fed

to steers for a period of 112 days, it required twice as much wheat as corn to produce 100 pounds of gain, but when these same steers were finished out for the next 49 days on corn and bran, the lots that had previously had wheat made the remarkable gain of 3.1 pounds daily as against 1.5 for the ones that received corn during the preliminary 112 days.

Now as for the shrunken or low grade wheat. In Utah, North Dakota, Minnesota, and New Mexico, low grade and shrunken wheats have been tested for feeding and in practically all cases the feeding value was found to be very close to the best grades. The following, taken from North Dakota Bulletin No. 84, gives a comparison of rejected wheat or what would grade as No. 4, with an average sample of wheat:

	Ash.	Protein	Crude fiber	Carbo-hydrates	Fats
Low grade wheat	2.4	14.5	2.9	77.6	2.6
Average wheat ..	2.0	13.2	2.0	80.3	2.2

This comparison is of total nutrients and not of digestibles as in other table.

Farmers who have badly shrunken spring wheat, rather than sell it at a sacrifice, had better hold it for their live stock, and the best returns will be received first from hogs, when it can be fed either soaked or ground. Then to dairy cows, grinding it and mixing with ground barley, oats or bran and cottonseed meal. To young animals for producing growth or to steers during the early part of the feeding period.

Meteorological Report

For July---	1915	1914
Maximum temperature	84.69	85.8
Minimum temperature	51.19	55.2
Monthly mean	67.94	70.5
Normal	--2.07	+ 0.4
Precipitation	4.02	2.65
Normal	+2.45	+ 0.89

The Silo Man Says:

To figure the proper size of your silo, allow three tons of ensilage to all cattle over one year. This is sufficient over-capacity to take care of the calves, and allow for some stock increase.

A silo will pay if one has twelve or more head of cattle, It will increase the amount of stock the farm can carry.

All silos freeze to some extent in the Northwest. That is no objection to building. This freezing is largely controlled by the way the ensilage is taken out. Keep the sides low and the middle full. Set the silo on the sheltered side of the barn.

Location is important. Filling is at most a two or three days' job. Feeding may last half the year. Put the silo conveniently near the mangers.

An expensive barn in connection with a silo is not necessary, but a warm and well-ventilated barn is essential.

All kinds of silos are good—if they are properly built. This means a solid foundation and tight walls. The foundation should go below the extreme frost line and should be plenty strong enough to carry the load of the walls without danger of settling.

Whatever the preferred make of silo, see that it is well set on its foundation, properly banded or reinforced, and if of wood, amply anchored against winds.

"The deeper the silo the better the ensilage" is a rule to remember while building. Farmers in the older sections are building as high as sixty feet. Increase of height renders doubly necessary the caution about foundations.

It will pay to use a creosote paint on the inside of a wooden silo and to wash with clear cement the inside of a concrete or brick silo.

The so-called "pit silo" can only be built where the ground is always dry to beyond the extreme depth of the

silo—in other words it will not work where you can strike water while digging.

Carbonic acid gas is formed by new ensilage. In the pit silo or in others with air-tight walls above the ensilage this gas collects and may kill the man who enters. Lower a lantern; if it goes out or burns dimly it is unsafe to enter.

Packing properly is the great thing in ensilage making. Tramp the edges. Imagine you are making a par of sauerkraut.

The closer corn is to being ready for the shock the better it is for ensilage. Don't waste time snapping the ears. Feed the whole-corn ensilage, and let the hogs gather the waste by running behind the cattle.

Ensilage is not a balanced feed. It needs clover of alfalfa hay and ground feed in addition.

For a cow giving thirty pounds of milk per day ten or twelve pounds of alfalfa hay, eight to twelve pounds of concentrates (bran, shorts, ground feed, mixed) and thirty to forty pounds of ensilage forms a good ration.

Ensilage fed in excess, to the exclusion of other feeds, especially if made out of unripe corn, does not give good results. The ensilage is not to blame. Blame the feeder.

Cow peas, oats, sorghum, or other crops of like general nature make good ensilage, bearing the same general feeding value to corn ensilage that the crop so used bears to the corn crop.

The silo creates pasture conditions throughout the year. Rightly managed, it will pay for itself in two seasons. This year, with the problem of saving and using soft corn on our hands it will pay for itself before grass comes.

If there are any details concerning silos, ensilage, ensilage feeding, write for a return-mail answer to the F., S. & H. Silo Service Department. It is personally helping hundreds of others, it will be glad to help you.

How to Stack Grain

From "Farm, Stock and Home"

Select a high spot, preferably entirely off the field, which has natural drainage but not far enough to make useless hauling. Break up the surface and harrow it to a finely powdered mulch, to keep the ground moisture out of the stack. If possible, lay a secure foundation of small tree trunks, rails or cord wood, anything which will hold the grain off the ground, giving as much ventilation as possible. Your own ingenuity will tell you how to do this with the material at hand.

Start in the center with two bundles precisely as you would build a shock, laying up the bundles against the sides of this shock until you have a circle as large as the stack you wish to build, slanting the butts from the center, the heads of each row fitting up snugly to the heads of preceding row.

After you have built this flat cone, begin the second layer from the outside, "breaking joints" by laying the bundles snugly in the hollows of the first layer, heads to center. The main purpose of the stack is to shed water and this should always be kept in mind while building the stack.

Be careful to get the first four or five layers very solid before you begin to "bulge" continuing the stack precisely as a thatched room is built. Have plenty of pitch to your bundles, laying them with the short side up, always building the middle high, but not so high that the bundles will slide out of place on the outside row, Don't attempt

to make your stacks too big or too high, as it adds to the labor.

Gradually draw in the stack until it makes a peak, placing your sheaves at the top precisely the same as you would on a shock to shed the rain. Hold the capsheaf in place with a strong cord or wire, weighted with anything heavy enough to hold it down, as a protection against heavy wind.

If you prefer to build a long rick instead of a stack, the principle is just the same. There is a good stacker in every neighborhood, and it would be a good plan for farmers' clubs to set a date and help this man stack until every man understands it thoroughly. Be sure to make your stacks as solid and secure as possible, or it will be labor lost. A leaky stack is worse than no stack at all.

Benefits of Stacking

1. It will save grain and straw, which might be spoiled in the field, especially in wet weather.

2. The grain will go through a complete sweat, and will be superior in quality to the grain threshed from the shock.

3. Threshing is made considerably easier, and nothing like the amount of help will be required, as in the case of shock threshing, so that the total cost will be practically equalized.

4. There is a big crop this year, and there are not enough threshers at hand to thresh it, nor cars enough to haul it for weeks or perhaps months, and this will give you good storage at absolutely no cost. It will also prevent the market from being glutted at one time, as is usually the case, which may give you better prices for your grain.

5. It will clear your field for early plowing, which is one of the greatest factors for increasing the wheat yield.

Vaplon Urges Women to Use Colorado Beet Sugar

More than 300 Pueblo women crowded the Commerce Club rooms in that city recently for the purpose of witnessing a canning demonstration conducted by W. E. Vaplon, of the Department of Agriculture.

Professor Vaplon told Pueblo women that they should patronize a Colorado industry and use beet sugar. He told them emphatically that the old idea that cane sugar made better jellies, preserves or canned foods than beet sugar has been effectively exploded by government experts working without prejudice or favoritism. He made the claim that beet sugar would do anything that cane sugar would do, do it as well and a little cheaper. Then Vaplon proceeded to show the women as well as tell them. He used beet sugar throughout his demonstrations wherever he needed sugar.

But besides imparting some valuable information about Colorado Beet Sugar, Professor Vaplon told the ladies many things about new discoveries in canning. Then he proceeded to demonstrate some of the discoveries. He had a little oil stove placed where all could see and he canned beans, carrots and cherries.

He said the old method of cooking three days in the cans in succession was good, but that the repeated cookings were unnecessary in the light of new discoveries. He told how to can at one cooking. He discussed the canning of meats and finally challenged his hearers' curiosity by informing them that fresh eggs could be canned, shells and all, and kept indefinitely. But canning eggs is not properly canning. It is only by placing them in water glass. Prof. Vaplon urged women to obtain eggs laid in April, place them in water glass and keep them as long as desired. While water glass is a well known egg preservative, the idea of using it to lay away cheap eggs for winter is new.

THROUGH THE LEAVES

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Agricultural Notes

W P. Hogarty

Again let me call your attention to the limited seed supply and urge upon you the necessity of thorough preparation of the soil. We do not know what next spring will bring forth, it may be one of those dry windy springs that you and I have seen before, and which makes germination of seed difficult and the pulverizing of the seed bed impossible. The nearest you can come to preventing such a condition is by fall plowing. Try and get at least fifty per cent of your land for next year's beet crop plowed this fall. You will never regret it, and keep fresh in your memory those words of Fred Noble, "IF I HAVE ONE ACRE OF LAND TO PLOW FOR BEETS IN THE SPRING, I FEEL THAT I HAVE NOT DONE MY DUTY."

Spring wheat has been a failure this year due to rust, which is frequently the case. I question the advisability of growing any spring wheat on our high priced irrigated land. Sow fall wheat, and in order to get the proper rotation of crops it almost necessitates plowing under the third cutting of alfalfa in August for this crop, then fall plow the next year for your beet crop, after growing two or more crops of beets, sow your beet ground to barley with alfalfa and feed the barley.

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We have had a splendid rain, but do not need any more until we get through with the harvest.

+ + + +

175 growers asked for pulp this year. There was a general feeling that there would not be the demand for the product this season after two years of not very profitable feeding. But this feeding game seems to be a habit hard to break away from, and I hope it will be always thus in

northern Colorado. Our new silo is about completed and the new road to the pit is a dream, it will be put to the extreme test this winter and I hope it holds up in good shape. We are going to be very strict this season with reference to the overloading of pulp wagons. In the past some have placed more on the wagon than would stick, with the result that the stuff was spilled all over the yard and road. Don't do it this year. You may have to pick it up, besides there are only two places where the pulp is enjoyed, in the silo and the cow's stomach.

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In the August number of "Through the Leaves" we enclosed cards asking all who were desirous of feeding pulp the coming year to kindly fill in and mail the card to us prior to Sept. 5th. Of the 175 applications received there were 15 who were late, and said they did not receive any notice, giving you who made this statement the benefit of the doubt, we assume some of you did not get the booklet, but part of you did not open it, proving to me that you did not read it. I do not know as I blame you much, only we use this periodical as a medium for transmitting information to you instead of by the bulletin system, the method employed by other factories. You should glance over them for that information, besides if this book is not worth reading it is not worth the stamp necessary to get it to you and there are others who would like your copy, so one of these days I am going to suggest that we place a notice in this paper that reads something like this "'Through the Leaves' for 1916 will be mailed only to those growers who cut out the notice and mail to this office prior to a certain date." We will at least find out how many of you read it and want it. Another thing, you have an idea that would be beneficial to all of our readers, but you are afraid to write us about it. Now if you will give us that thought and don't care to express it in your own words we will have somebody write it up and give you due credit for it. It will give us material for the paper and you will have done the community a benefit by conveying a thought or idea which is the usual result of your reading and experience.

It is a deplorable fact that we cannot leave anything loose at our dumps but that somebody borrows it and puts it to his own use. I do not think they mean to steal, but figure that the company is rich and can replace the article taken, which we can, but when you figure the first cost, the trouble of conveying the article to the point, often 25 miles from the base of supplies and the inconvenience of not having it when needed, it is to say the least, annoying. We have had shovels, wrenches, cables, pinch bars, lumber and sample bags taken. We have had even the scale beams removed. We left a cook stove out at a scale house two years ago and during the summer they took the stove and left an inferior one in its place, and this year they took the poor one, consequently just as soon as the harvest is over we bring in every thing around the dump that can be pried loose and cart it to the factory for safe keeping, and if anything is forgotten, good-bye. In carting this material back and forth, stoves, scales and other frail stuff becomes broken, and it is too bad that this equipment cannot be safely left at the various stations. We do not always know who does it, but if you would all act as a committee of one to help us stop this pilfering it would be appreciated and enable us to leave the key hanging on the outside. The above is particularly true of sample bags. These cost us about 35c each. They are never sold by us and their possession by anyone other than The Great Western Sugar Co. is prima facie evidence that some one has a deplorable lack of regard for the private ownership of property.

+ + + +

The greater part of our weighers for the receiving stations are ladies, and home products. Our lady weighers have proven very satisfactory for the past two years, and we are glad to be able to give them employment The objectionable feature in employing ladies is that we get about 150 more applications than we have positions for, then they are disappointed. Never mind, we will recommend that more farmers grow more beets so as to have more stations and consequently more jobs.

Harvesting Rules

We began the harvest of our beet crop Monday, Sept. 27th, and while we think you are familiar with the rules of the company governing the delivery of the crop, we will again call your attention to them so there will be no mistake.

In the first place there is only one use to which we can put your beets, and that is for making sugar, consequently it is our desire to purchase all of the product suitable and in a condition that we can keep it until converted into sugar. That is the whole story.

Our receiving stations will be open at 7:00 a. m. and probably a little before, and close at 5:30 p. m.

The scales will be tested twice a day, once in the forenoon and once in the afternoon, and it is hardly possible that any scale can get out of order and escape our attention more than an hour or two.

Be sure and instruct your hauler to know the gross weight of your load as called by the weigher before leaving the scale.

The storage piles at the dumps are to be 8 feet high this year, as experience has taght us that beets will keep better piled at this height, than shallower piles with less beets exposed. There is always more or less of a loss in beets being run over and destroyed by the wagons when delivering beets at the pile, and most of the northern Colorado factories have made the rule that each teamster must pick up his beets to avoid the next in line from driving over them. I appreciate that this is not always convenient as you may be driving a team that is nervous and needs your attention, but we will work together along this line. Don't let your help get careless, and don't let the horses eat or paw over the beets while you are unloading, turn their heads away from the pile.

You are familiar with the delay and expense that leaves and trash cause us at the factory, so please watch this point.

You are all acquainted with the rule pertaining to tight wagon boxes, driving slowly to the scales after receiving your dirt, and shoveling dirt at the pile. To evade this rule does not get you anywhere, and your individual gain

before detection, is small, yet in the aggregate it amounts to a considerable sum to us. There are only a few growers who need their attention called to this clause because as a whole you are a mighty satisfactory bunch to do business with.

The sugar losses of The Great Western Sugar company caused by imperfect and frozen beets are enormous, and in the past I believe we have been easy in this regard. THE LABOR MUST BE INSTRUCTED, AND YOU MUST KNOW THAT IN HANDLING OUR LARGE CROP WE CANNOT RECEIVE FROZEN BEETS. I appreciate the effort necessary on your part to get your labor to see that the beets left out are properly covered and protected, on the other hand it does not make you feel any better if we have to turn down your product.

The silo clause in our contract has been waived. However, this does not make the siloing of beets prohibitive. We still offer the additional 75c per ton for siloed beets where we can get a sufficient number siloed so the expense of receiving will not be too great. All of the factories, with the exception of ours, get some beets siloed each year, and as we are going to be more particular this season than ever before in the receiving of frozen beets you may find it to your advantage to silo a portion of your crop. Do not do it, however, without consulting this office.

There are a few growers yet who feel that the results we obtain in the laboratory and in the tare room are not correct, and we extend you the privilege of employing a check weigher, tareman or chemist, and he will be given every facility to make his work satisfactory to you.

Be sure and see that your wagons are equipped with a brake or iron rod dragging at the rear of your wagon. Don't drive onto the dump until the team already there is leaving. We have thoroughly repaired and strengthened all of our dumps but there is a limit to their strength and remember, " SAFETY FIRST."

In conclusion, we demand that our dump employees treat you with every courtesy, and give you all the aid possible in dispatching the work and making the delivery of your crop a pleasure, and in return we request that you give us like treatment.

Community Benefits of the Boulder County Fair

Rae H. Kiteley

To those of us who have lived in Longmont or vicinity one of the first thoughts suggested by the above subject is of the transformed appearance of the City Driving Park. The natural frog pond with its attendant objectionable surroundings has been started well on its way toward a spot of beauty for the recreation and practical education of the people of Longmont and Boulder County.

The visions and indefatigable labors of such unselfish souls as N. R. McCreery and C. L. Hover, the president and vice president of the Fair association, were effective in conceiving and successfully carrying out a plan that is unique, but founded on stable and unimpeachable principles. The Park commission was reorganized and energized, as a part of the movement, and the control left so largely in the hands of this legally constituted board of the people that no individual can reap any pecuniary profit and so that the public is assured of all the benefits from the annual receipts of fairs as well as from the $14000.00 so far subscribed by public spirited citizens.

A proper question to ask is, how have the different portions of our community benefitted from this year's fair and what may be expected in the future?

Take first our industries from the operator standpoint. The Sugar company, we will all agree, is a far sighted and successful concern, and the fact that it has subscribed a thousand dollars to a capital stock that cannot even pay interest, and on top of this has given and will give without stint, the time of its expert employees and the gratuitous use of hundreds of dollars worth of material,

ought to return the company rich reward in increased favorable esteem.

Our mills, cannery and numerous other factories were heavy subscribers and prominent exhibitors. They succeeded in showing their products to the mutual advantage of themselves and those who supply the raw material.

The retail dealers were on hand with their wares calculated for the pleasure, economy, labor saving or improvement of human existence on farm or in city and their demonstrations no doubt resulted in greater sales and wider and fuller life for the purchasers. The automobile, the tractor, the improved devices in farm implements, the milking machine, the gas engine hitched to many contrivances, the vacuum cleaner, the electric range are but examples of the many things shown which could qualify for the above mentioned purposes.

But the city man and his enterprises were not even chiefly in evidence. A visit to the horse stalls, the poultry tent, the swine and sheep pens and the cow barn showed that the man in the country, who raised fine stock could show it with profit to himself in larger and higher priced sales and to the profit of the observer, who could learn the lessons of successful breeding and care and seize the opportunity to build up his own stock to a higher standard. The premiums awarded were not of great intrinsic worth, but the grave discussions as to whether the ribbon belonged to the buyer or exhibitor spoke eloquently of the value of those same ribbons.

The spacious and well-built exhibit hall, which we hope is but a fore-runner of many similar structures, is one of the most important community benefits for throughout the year, but its initial use, for displaying farm and garden produce and domestic science and art products was a most creditable one. The individuals in the great crowds which saw what was shown and who studied the awards of the judges could not but be benefitted and inspired with a determination to do as well or better than the other fellow another year. That such was the inspiration was evidenced by the many statements of surprise as to what had been and could be done and promises that the next Fair would find them exhibitors. The interest in boys and

girls clubs and exhibits should not be forgotten and the latent possibilities therein cannot be over-estimated.

The entertainment features of this year's program served to attract the people so that they might get the benefit of the solid and permanent portions of the Fair, but it was the policy of the directors to make mere entertainment subsidiary and scrupulously clean. Those who know tell us that many county fairs have failed because of crooked horse racing, instead of royal contests between high bred, record breaking and local animals, and because of substituting for innocent amusements the gambling features of the Midway, Pike, Trail, Pay Streak or Zone. The desire has been that the farmer should go home with much information about better stock, better farming methods, better seed and better crops instead of "a headache, a pair of imitation diamond cuff buttons and a vision of a lady in tights doing stunts on a flying trapeze."

The following list of some features in a regenerated county fair in the state of New York is an indication of what we hope for in Longmont:

Demonstrations, Stereopticon Views and Lectures on Seed Selection, Plant Pathology, Birds and other Farm Topics,, practically continuous in separate building for the purpose. Poultry contests for boys, exhibits by school children of Drawings, Bake-stuffs, Handiwork and handicraft; Grange picnic; one hnudred boys taking course of lectures and passing a rigid examination thereon; an equipped laboratory from the State Agricultural College for Plant Disease work; boiled down talks to the grand stand; a scientifically planted and protected potato patch inside the race track.

We have succeeded fairly well in this first year of the Boulder County Fair. We can make that success far surer if we show some appreciation of the extensive and unselfish work of the officers, superintendents and helpers. We can add to that success by giving the use of our own means in buying capital stock and of our own time and energies in fostering the healthy growth so auspiciously begun.

Farm Surveys

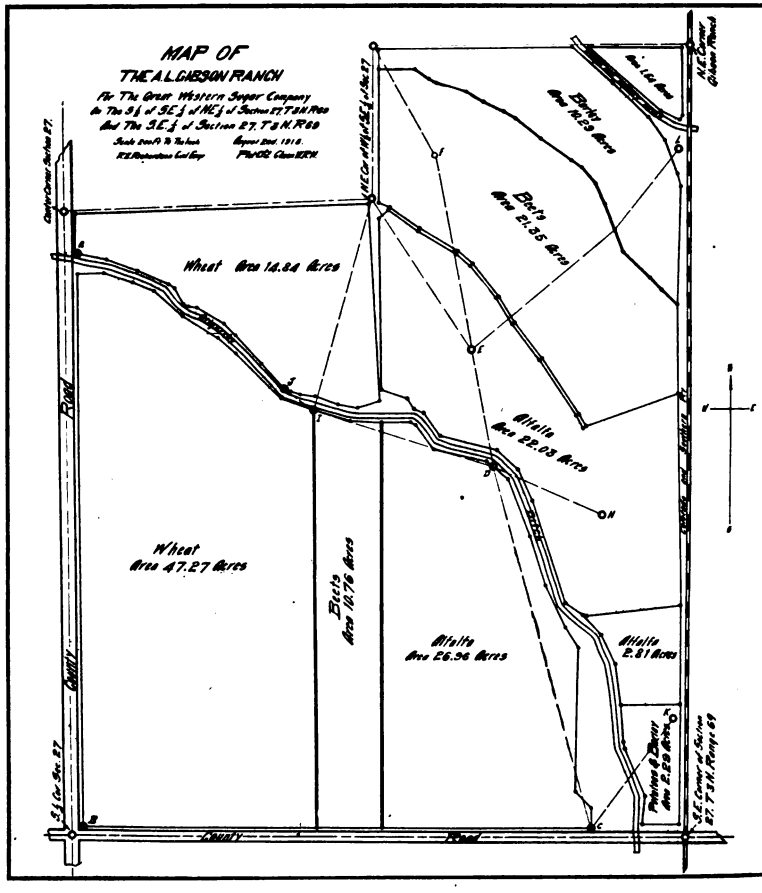
R. E. Richardson, Civil Engineer

It is a well known fact, that as a district becomes more settled up, and each man works a smaller piece of land, land becomes more valuable, and the average yield per acre increases. For example, in France, a man makes a good living off from five to ten acres, on which he raises three crops per year, grapes, mulberries and the silk worm. The reason is, he knows what he has got, and watches it closely.

In Colorado we haven't reached the small farm stage, and few Colorado farmers know just how much land they have under cultivation, how much waste land under ditches, or any more than approximately, what average they have in each field, and this fact alone is one of the greatest obstacles to be overcome before a farm can be made to yield its maximum.

During the summer just past, we surveyed over 6,000 acres of beets, lying in nearly 700 fields. If all of these fields were perfect squares, the distance around them would have been nearly 350 miles, and the actual distance was probably 700 miles. The cost for all this work to the grower was about $900.00, or about one cent for each ton of beets raised on the land. A large number of growers had in less beets than they supposed, and some had more; now they know how many acres were in each field, and have maps of the field showing the true acreage. Would it not be a paying proposition to extend these surveys to cover the entire farm, so that the exact number of acres in each field would be known.

On the following page is a map of the A. L. Gibson ranch, showing the results of such a survey. The original of this map is on the same scale as the beet plats, and has been reduced to its present size, for an illustration. It would be better in the farm plats to use **blue line prints** on a white background nstead of the common blue prints, and that not less than half a dozen prints should be furnished with each survey. This will add slightly to the


MAP OF
THE A.L.GIBSON RANCH
For The Great Western Sugar Company
On The S½ of SE¼ of NE¼ of Section 27, T 3 N R 69
And The S.E.¼ of Section 27, T 3 N. R 69
Scale 200 ft To The Inch
Wheat Area 14.84 Acres
Wheat Area 47.27 Acres
Beets Area 10.76 Acres
Beets Area 21.35 Acres
Barley Area 10.29 Acres
Alfalfa Area 22.03 Acres
Alfalfa Area 26.96 Acres
Alfalfa 2.81 Acres
Pointers & Barley Area 2.29 Acres
County Road
County Road
Center Corner Section 27.
N.E. Corner Gibson Ranch
S.E. Corner of Section 27, T 3 N. Range 69

expense, but it will furnish a very good and convenient record. One plat can be used each year for a complete record of the farm. On the plat can be kept the record of the production of each field, what it cost to raise the crop, the amount realized for it, and other matters of interest to the grower. A comparison of a few years record, will help the farmer to see what fields are best adapted to certain crops, what fields are producing properly, what line of crops yield the best revenue on the different fields, etc., thus enabling him to increase the production of his entire farm.

Most farmers are under the impression that there are more acres under cultivation on their ranches than an actual measurement shows. I have made surveys on many ranches, totaling several thousand acres in all, and there are only a few ranches where there is over 140 acres out of 160 in actual cultivation, the balance being taken up in roads, ditches, farm buildings, etc. Many of these ditches can be abandoned, and a strip of land from 12 to 30 feet in width brought under cultivation. When these fields have been actually measured you know how much seed to buy, how many acres you will plant, how much help you will need, how much money it will take to raise each crop. Is it any advantage to the farmer to know whether there is 40 acres or 50 in the fields he intends to plant to wheat? Does it not hold equally well for the alfalfa and other crops? Is it a square deal or good business to contract with beet help for 25 acres of beets, and when it is measured find out that it may run from 20 to 30 acres? How about the farmer who has the equipment to handle a certain number of acres of any kind of crop, and then finds that he has in more than he can handle properly, or not enough to keep his men and teams busy?

The best time to make a farm survey is in the fall and early winter. During the spring the weather is very uncertain and the ground often muddy, and in the summer it is very difficult to see any distance or to drag a chain through the growing crops. When the survey is made at the proper time of year, the cost for each quarter section of land will run about $25.00 including the six blue line maps.

How Hail Affects Yield and Per Cent Sugar

Asa C. Maxson

Hail has been the cause of a great deal of loss to beet growers as well as to growers of other farm crops during the past season. Not a month has passed since blocking and thinning time without its damaging hail storm in some parts of the Great Western Sugar Co. territory. As a result of this apparently unusual amount of hail many questions have been asked regarding the effect which it has had upon the final results in tonnage and sugar content. Briefly, the writer will attempt to give the readers of "Through the Leaves" some idea of this damage.

As has been stated in these pages several times in the past, the leaves are the part of the plant in which all plant foods, whether from the soil or air, are worked over into the compounds which enter into plant tissue and sugar. This being the case it can very readily be seen that whenever the leaves are reduced in numbers or their combined surface is reduced that less of these compounds will be produced. This means that both yield and per cent sugar will be less than if the leaves had not been destroyed.

Just how great this loss will be, will depend upon: The time in the season when the hail occurs; the amount of leaf surface destroyed; the previous treatment of the beets, especially regarding irrigation; weather and irrigations following the damage.

A heavy hail when the beets are very small is apt to kill many outright and in this way reduce the stand which will affect the yield. This is especially true if the beets have been blocked and thinned. On the other hand hail just before harvest would have little effect if the field had been well cared for in every way up to that time. Hail in mid-summer will have a marked effect upon the yield for the following reason: At the time the beets are hailed the crop is but partly made. The loss of the leaves will

lessen the rate of increase in weight of the beets and the increase in sugar in proportion to the amount of leaf surface destroyed and the time required to grow new leaves to replace those destroyed. The time required will depend upon the amount of leaf destroyed and the treatment of the beets after the hail. The more leaves destroyed the more of the material drawn from the soil and air will be required for their renewal which must take place before normal root growth and sugar storage can be resumed. This means that the growing season is shortened just this much which in turn means a lower tonnage and per cent.

The better the treatment has been prior to the damage the less the damage will be. For example: If we have cultivated and irrigated our beets so as to produce a maximum growth for that part of the season prior to the time the crop is damaged a shortening of the growing period will have less effect than if we have neglected the crop. This is so because the soil will produce only a certain yield which is relative to the fertility of the soil. If the greater part of this possible growth is made before the damage occurs it must be apparent that the loss of a few days will not mean the loss in yield that it would had the growth been retarded by lack of cultivation or irrigation.

Putting it in another way: Let us suppose that our soil would be exhausted after 120 days growing of the crop. If a hail storm comes 100 days after planting and we have 100 days of maximum growth on our crop and the damage by hail means it will take 20 days to grow new tops we really have but slightly more than 100 days growing season for our crop. Had we neglected the irrigating of our crop, and it was stunted from lack of water or other cause and hail comes when the beets are 100 days old they will not be as large as they would have been had they been well tended so we have not a full 100 days growth on them. Now if it takes 20 days to grow the new tops nothing is more apparent than that your crop will be less than though you had cared for your crop during the first 100 days.

If hail damages your crop during any part of the growing season, except just previous to harvest, irrigating at

once, unless sufficient rain falls with the hail, will quicken the development of the new leaves thus lengthening the period of normal growth which means a better yield and per cent.

If the soil is well exhausted so that very little new growth takes place after the new leaves are grown the per cent sugar will not be affected as much as it will be in the case of rich ground where a late growth is caused by the loss of leaves. To be sure the per cent will not be as high as it would have been had the leaves not been destroyed.

A late growth means a low per cent beet while early growth means higher per cent. This is true whether hail damages your crop or not.

Calamity Jane

Calamity Jane was a cow---just cow!
Slatty of rib and low of brow,
Gangle-shanked and seemed to be
A proper cow fer a man like me.
None of yer blue blood in her veins,
Jest a cow fer a man that can't take pains;
Jest the sort o' a cow your folks has got
A eatin' grass in the pasture lot.

Me an' Calamity Jane was twins
In bein' poor, and the' ain't no sins
But the world'll forgive ye, quick as scat,
But it ain't so keen on fergivin' that!
Calamity Jane, she did her best---
She et my farm frum east to west,
Uv hay and corn she et her fill.
But 'er ribs kep sayin' "poverty" still.
But I sort o' liked the ornery brute
With her busy mouth and her kickin' foot,
She counted 'one' when the 'sessor came,
And she sorta give me the local name
Of bein' the keeper o' cows an' sich,
An' my neighbors thot I wuz growin' rich!
An' the lan' wuz jumpin' five dollar a year
So Calamity Jane kep a stayin' here.

Then a neighbor o' mine he come along
An' he said my dope wuz all dead wrong,
An' he figured it out that fer feed an' care
'Bout all I got wuz hide and hair.
"An' ye know," sez 'e, "when yer notes come due,
She'd only fetch ye a pot o' glue;
An' ye'll pardon me, neighbor---I'm speakin' plain---
Yer a fool to board Calamity Jane."

Then I told him straight, "You mind yer biz;
"Calamity Jane is ez good ez they is!"
But he jes' kep' cool; "Ef she's yer best
You are sure in need o' the Babcock test."
An' he drove on home, an' Marthy Ann
Sez, "Who wuz that well-dressed travelin' man?"
An' I seen how her dress wuz old an' plain,
An' it struck me 'P'r'aps it's Calamity Jane!"

So I figgered it out with our creamery man
What the average wuth o' her milkin's ran;
And I tell ye, straight ez yer sittin' there,
She wuz wuss nor a vampire, hide and hair.
The schoolin' my children couldn't get,
The work an' worry that made us fret,
Our drudgin' an' scimpin' of hand an' brain
Wuz goin' to board Calamity Jane!

So I swapped off Jane an' three head more
Fer a cow I wouldn't a tetched before,---
Smooth an' silky, an' what wuz best
A cow that had stood the Babcock test;
An' if you've an hour or two to spare
I kin show you the best herd anywhere;
An' a meal in our new house'll make it plain
That we've left off a-boardin' Calamity Jane.

Wheat Alone, Unprofitable on Most Farms in U. S.

Lord Ogilvy in Denver Post

Land that would only yield twenty bushels of corn to the acre at 40 cents a bushel would only have a capitalized value of $21.81 an acre.

If the crop is increased to forty bushels, there would be a 5 per cent return on $116.36 an acre. A rise in price, of course, effects the same, or a rather more favorable influence on capital value.

The acreage must be big enough to provide a living for the labor applied for these figures to be applicable, for just as the first cost of working a corn crop and interest on the investment must be paid by the first bushels grown, so must the farmer have a living and return on his capital before he can have wages and all of these before he can show profit.

A ten-bushel crop of wheat may be made to show that land is worth $45.45 an acre when wheat brings 75 cents a bushel, but the net profit an acre is so small, $2.27 that it would be practically impossible to farm on this basis, because not enough land could be maintained in cultivation.

The figures used here are approximate, but they will show the comparison and can be made to fit any condition.

The total annual expense on a ten-bushel crop of wheat is figured at $5.23, the cash return $7.50, and the net $2.27.

A twenty-bushel crop gives a return of $15 an acre, a cost of $7.73, a net of $7.27, which is 6 per cent on $145.45 an acre. A fifty-bushel crop shows a net of $2.27 an acre and in every one of these cases from $1 to $5 an acre has been allowed for manuring or the fertility abstracted. The average wheat crop for the United States is around thirteen bushels an acre, so that the net return does not enable the farmer to make a living growing

wheat, and it is only in localities where it shows a profit per farm unit as well as per acre that wheat growing pays.

For a few years in new countries large wheat farms often pay pretty well, but none of them has endured three long terms of years, largely because labor was required intermittently in great numbers.

There were other factors, such as weeds and the land wearing out, but in the main the cause was that wheat can be grown cheaper as part of a farm crop than by itself, and that nearly all farmers grow some wheat for straw and its convenience in the rotation, even at small profit.

The increased product of wheat on well-managed farms is a direct result of labor applied to other crops in the rotation, especially leguminous crops and cleaning crops, such as potatoes and corn, so to the average farmer it is a question of a sufficient return in his labor and investment, not on one crop, but a number of crops that will make adequate return.

The success of the farmer lies very largely in his executive ability to bring about a system that is economic and for this factor the nation will always have to depend on the farmer.

No matter how skilled a farmer may be, when he comes to a new district he is best advised to note the methods of successful farmers who have been there for some time, for these have adjusted their methods to the number of working days in the year, and those periods during which it pays to prepare land and plant crops, and any wide divergence from such established principles is very apt to prove expensive.

It may be taken as a general principle that farmers know when it will pay to subdivide land and saddle it with the cost of extra buildings and equipment, for when an opportunity offers to do this they will very generally do so that their children may have farms, while there is a movement to subdivide beyond the point they deem economical they will generally sell out and leave the job to people more optimistic than themselves. The farmers are not always right, but they are most apt to be so.

Livestock Farming Best

Many farmers make a great mistake in hauling off to market all of their farm products in place of feeding them to livestock.

The International Dry Farming Congress has been preaching this doctrine for years, and will specialize on it at the Denver sessions, October 4 to 7, when an entire afternoon will be given over to livestock discussion.

Grain farmers who follow this foolish practice rob their soils of fertility and soon make their farms unproductive and worthless.

When a livestock farmer grows clover, alfalfa and grain, he draws very heavily upon the supplies of fertility in the land. This fertility he carries to the barn, places in the hay mow, in the silo, or in the feed bin. The cattle consume it, and the waste matter from their bodies goes back to the soil.

This largely, though not quite entirely makes up for the fertility that has been taken away. So nearly perfect is this process of return of fertility that in the case of the production of butter it takes about $900 worth of butter to remove 50 cents' worth of fertility from the soil.

It is for this reason that stock farming is the best kind of farming to follow. The farmer who requires his land to produce grain and sells that grain on the market is making the cheap raw material which other men manufacture into high-priced articles of general use, such as flour, linseed oil, beef, butter and pork and following the usual course of economic laws, he gets paid for his labor, and gives away the material out of which his product is made.

"The end of that kind of farming," says the Farm, Stock and Home, "is ultimate failure and can be nothing else, while on the other hand the man who manufactures something that lives on the land, or returns to it the highest possible degree of the fertility taken away by the crop, is manufacturing a finished product."

And again in harmony with the same economic laws

that go to make poor the seller of raw products, he gets return not only on his labor, but upon the labor of the stock which he employs to transform the raw material into the finished product and in addition to this he receives pay for the raw material itself.

This then makes the difference between the grain farmer and the stock farmer.

Meteorological Report

For August	1915	1914
Maximum temperature	80.29	86.04
Minimum temperature	49.41	51.07
Monthly mean	64.85	68.55
Normal	+3.21	+ .49
Precipitation	2.16	0.59
Normal	+1.17	--.40

THROUGH THE LEAVES

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Agricultural Notes

W P. Hogarty

When pulp was allotted to our growers we tried to apportion the product in a fair manner and see that all were cared for, some 175 in number. Now we are receiving indirect information that a great many of the smaller feeders are not going to take a chance at the feeding game, and will not use their pulp this season. As the pulp was allotted on a conservative basis a great many of the growers did not get an amount sufficient for their requirements, and if you have fully made up your mind that you are not going to use your pulp you will confer a favor on us as well as your neighbor if you will advise us to that effect, so that we may increase the allotment of those who do wish to feed. We are furnishing an excellent quality of pulp and the conditions at the silo are ideal.

+ + + +

We have just finished siloing 4,365,600 beets to be set out next spring for our seed crop. These beets have to be set by hand and tamped and it is some job.

+ + + +

There must be a lot of reasons against the siloing of beets, some that I have heard of are the delay in receiving the money for the crop, shrinkage in weight, additional work, etc., and we have many farmers who prefer to haul their crop through mud than even think of siloing. Feeling as you do I hope you are never called upon to silo, but personally I believe it to be an economical method, and especially in a year like the present, and we have growers who are siloing their entire crop. We are siloing on the company farm, the method being to throw 24 rows together and covering with dirt, leaving a small opening at the top of the pile. This work is done by the labor at an additional cost of $2.50 per acre, which is plenty

for the extra labor done. Many prefer the siloing in the corner of the field. But this operation embodies too much labor and expense, besides, if you are going to shovel the beets onto the wagon you had better haul them to the dump I do not think siloed beets will show in excess of one per cent shrink this season, and probably not that.

+ + + +

The subject of tare is a difficult one and especially so when the soil is wet and the beets dirty as has been the case this fall. The grower does not like to haul his beets to the dump and find that 25 to 50% is deducted for dirt, and I do not blame him.

I have yet to find a farmer friend who received a heavy tare that felt his beets were sufficiently dirty to warrant such a deduction. We have tried to verify our tare results at the receiving stations by taking the tare on whole loads, also by taking the tare on the piles in the fields, we have taken fork tares plus the dirt hauled back in the wagon and checked it against the tare box, and our results at the station do not equal the actual tare. Then comes the piled beets and the problem of getting the right tare is vexing when dirt is shoveled from the wagon and we have about come to the conclusion that the fair way is to take the light weight of your wagon from the dump as your light weight from the pile. It now requires one or two men at the pile to see that dirt is not shoveled and this plan would eliminate this necessity and allow the men to serve you in some other way. One farmer said today, "When you allow my neighbor to shovel dirt you do me an injustice," and I was glad to have him speak that way because it is the truth.

Our help at the receiving stations say, "Look out for some of the loads received between four-thirty and five-thirty p. m." One young man working for a beet grower came home from the dump last night and told his employer: "I got the best of the Sugar company that load." A beet grower and a good one, said to one of my employees yesterday when he was requested not to shovel dirt: "I wish every ton of these beets I am shoveling would cost the company $10.00."

Now the idea of piling beets is for your accommodation

so you will not have to silo or be delayed in the harvest, and I hope you will consider it a privilege rather than a hardship, and on account of the few who take pleasure in shoveling the dirt to us you may look forward in the future to a different method of determining the amount of dirt in the wagon.

+ + + +

The sugar content of the beets is gradually increasing until the average to date is 16.33 as against 16.63 last season. The hail injured about 2,000 acres of our crop and the recent heavy rains have had but little effect upon the sugar content.

+ + + +

We will pay for about 130,000 tons of beets October deliveries as against 175,000 tons last year. The heavy rains delayed us during the fore part of the season but the deliveries the past week have been the heaviest in our history.

Piled Beets

H. Mendelson

We paid last year in the Longmont district for 84423 tons of beets piled. We hauled out of the piles 77433 tons. The shrinkage was 6990 tons or 8.3%. The beets put in the piles had 16.76% sugar. The beets hauled out of the pile had only 16.45%. We therefore put in the pile 14151 tons sugar and hauled out 12742 tons, a loss of 1409 tons sugar.

Part of this loss is of course due to natural shrinkage and deterioration. Part, however, is due to the fact that with present methods we are unable to get that part of the tare which is obtained in form of dirt screenings, when beets are delivered over the dump. This year, when beets are quite dirty, this is a very serious matter for us.

At any rate, the often expressed opinion that the farmer gets skinned by the factory in the matter of tare, is not borne out by the figures quoted above.

"Divide the Dollar," System of Renting

H. H. Simpson

As one travels over the county he cannot help but notice that there is a great difference in the appearance of farms. The first thought that comes to mind, is that the difference indicates a great variation in the efficiency of farmers. However, if one will take the time to investigate he will find that while this is true, and does in a great many instances account for this difference in appearance, as well as the difference in the yield of crops, there is another factor that acts as the stumbling block for improvement on a great many farms. Careful inquiry will show that in the majority of cases the worst run-down farms are the ones that are being rented and where the one-year contract is used.

It is next to impossible to increase the production of a farm or even to maintain it at its present output where there exists no greater interest for the next year than the system affords. The most profitable agriculture is built, not so much on the chaotic work of today, as the carefully planned work of tomorrow. The tenant may be a good farmer, but no man can practice good farming unless he can plan ahead. The land owner may see that certain improvements would mean greater efficiency and greater profits but is not warranted with such small returns. Thus it goes on from year to year, changing renters, robbing the soil of fertility, and decreasing production.

When one considers that 34.3 per cent of the farms in Boulder county are operated by tenants, he can readily see what it would mean in promoting better agriculture, if a system of renting were used that would put the land owner and tenant on an equal footing, and by so doing cause each to work toward increasing and not decreasing the profits.

The plan which is outlined here is based on live stock

farming, as such is the only system that can give permanent satisfactory results.

Probably the most satisfactory system now being used in renting is for the land owner and the tenant to become equal partners in the business and share alike in all transactions. The first requisite in such a partnership, calls for a lease covering a number of years, 5 to 10. This gives the renter partner a greater incentive to work toward the improvement of the live stock and farm for he will share equally in the increased returns. It offers the simplest methods of dividing profits, leaves no opportunity for any misunderstandings, and the risks fall on both alike, causing each to work together in more perfect harmony.

The landowner furnishes the land, house for tenant, and all necessary buildings. The tenant furnishes all labor, which includes the boarding of the help, as the board is an essential part of the wages for labor.

Both parties should own an equal interest in all stock, including the work teams and all necessary machinery. In this method each should stand one-half of all expense such as feed bought for horses and dairy cows, seed, fertilizer, repairs and machinery, binding twine, threshing bill, etc. The farm owner pays for material used in repairs of all permanent improvements and fences, and for all new constructions while the tenant should do all odd jobs like grading roads, keeping permanent gates and fences in repair, and the general improving of things; for the compensation he receives as represented by rental of house and garden plot. It is needless to say that the tenant should agree to keep the farm as free from weeds as good husbandry requires.

The returns from sale of all products, crops, animals, butter, cream, eggs, etc., should be divided equally. In some agreements, the butter, milk, cream and eggs used in the household are recorded but not charged against the tenant. However, I believe these should either be charged or an equal amount allowed the land owner, as they amount to a considerable sum in a year, and would always leave a chance for criticising on the amounts used.

If the tenant has not capital enough to buy one-half interest in the stock, his partner may have and should let

THROUGH THE LEAVES

NOVEMBER, 1915

Notes on the International Dry Land Exhibit

Asa C. Maxson

Like all large exhibits, the 10th International Dry Land Exhibit, held at Denver, was so large that one became more or less confused in attempting to see it all in one or two days. However, if one had some particular thing in mind and spent time enough studying the exhibits covering this phase of agriculture a great deal of valuable knowledge could be acquired in a relatively short time.

The writer spent one day in the Congress which was held in the 1st Baptist church. On this day the topics up for discussion all pertained to soil culture and crops. The greater part of the discussion centered around a comparison of summer tillage as against continuous cropping in dry land farming. Both the affirmative and negative sides had many supporters, however, to an outsider it appeared that both sides were advocating the same thing but in a different way. The most interesting figures presented seemed to indicate that growing an intertilled crop, such as corn, every other year gave very nearly as good results in wheat per acre as the fallow system. This being the case the "drylander" would under this system have the additional feed produced in the form of cornfodder and grain, which would not be an unwelcome product, and which should pay for the plowing and tending of the crop. This in turn would decrease the cost of producing the following grain crop as compared with the fallow system.

At the close of the discussion the president of the congress who is a strong advocate of summer fallowing, said: "I am much impressed with the last sentence of the speaker who has just presented his views, in which he says in substance, that the only way we can get away from the summer fallow system is to practice SOME OTHER kind of summer fallow!" The speaker referred to had just ad-

vocated raising corn or some other cultivated crop alternately with dry land grain.

The day spent at the exhibit could have been lengthened to a week with profit. However, as this was not possible, the time was spent studying such exhibits as appealed to the writer.

As the name of the exhibit indicates its main object as well as that of the congress is to further "dry land" agriculture. In this connection the exhibit in the government department which showed the work being done at Akron, Colo., on the water requirement of crops was especially instructive. The work at this station shows very clearly that some plants and crops require much more water than others in proportion to the dry substance produced. The following table gives the water requirements of some of our staple crops and common weeds. These figures are to be interpreted, as meaning the amount of water required to produce one pound of dry substance or one pound of the crop after every vestige of water has been removed:

Crop	Pounds water to 1 lb. dry matter
Wheat	513
Oats	597
Barley	534
Corn	368
Sorghum	322
Millet	310
Potato	636
Sugar Beet	397
Alfalfa	831
Weeds—	
Pigweed	297
Russian thistle	336
Sunflower	683
Lamb's Quarter	801
Ray-weed	946

A study of the above figures reveals the fact that corn, sorghum and millet require less water to produce a pound of dry matter than any of the crops reported. This economy in the use of water recommends these crops for dry land forage purposes. Of the small grains, wheat uses

less water per pound of dry substance than either oats or barley. Sugar beets are lower in water requirement than any other crop common to our locality when we consider the amount required per pound of dry matter, but the fact that the amount of dry matter produced per acre, which is relatively high as compared with the other crops, is so great it follows that the total water per acre will be larger in comparison with other crops than the figures indicate.

When we consider the weeds we find that the amount of water used is larger in many cases than for crop production. This shows very clearly that summer fallow where weeds are allowed to grow is wasteful of water. The fact that a field is weedy means much less water for the crop growing among the weeds which in turn means lower yield and less profit. Why pay out good money for water to grow weeds which we pay our help to destroy.

Another phase of the water question was graphically shown at the Nebraska Agricultural college's exhibit. This showed the water requirements of corn on soils of different degrees of fertility. On poor land it required 463 pounds of water to produce 1 pound of dry matter. When this same soil was manured it required but 323 pounds water.

Fairly good soil produced 1 pound of dry matter for every 383 pounds of water while the same soil manured produced the same amount of dry matter for every 308 pounds of water. Fertile soil required less than either of the preceding, there being required but 327 pounds of water to produce 1 pound of dry matter without manure. This same soil manured required but 299 pounds of water per pound of dry matter. In other words, this means that if you have but a certain amount of water to apply to your land that by manuring you can make this water produce more crop. This in turn means cheaper water figured on a ton of beets or a bushel of grain.

In the Washington Agricultural College exhibit figures were given which show the yield of wheat following var-

ious crops and fallow. The following table gives these figures:

Wheat after Carrots	27.81 bu. per acre
Wheat after Potatoes	29.42 bu. per acre
Wheat after Fallow	30.03 bu. per acre
Wheat after Sugar beets	28.67 bu. per acre
Wheat after Beans	30.55 bu. per acre
Wheat after Peas	30.47 bu. per acre
Wheat after Millet	21.30 bu. per acre
Wheat after Corn	29.50 bu. per acre
Wheat after Sorghum	17.70 bu. per acre
Wheat after Barley	15.62 bu. per acre
Wheat after Oats	10.48 bu. per acre
Wheat after Wheat	10.08 bu. per acre

The striking things above these figures are the high yield shown where wheat follows a cultivated crop, the low yield where wheat follows a grain crop, and the high yield where this crop follows a legumenous crop. In the case of fallow it must be remembered that there are but 30 bu. produced every other year which means only 15 bu. per acre yearly.

Aside from the above there were many other valuable lessons to be learned at the exhibition but time and space will not permit of their mention. It is to be regretted that the exhibition came at a time of the year when the farmers were so busy as a visit to it would have well repaid any one for the time and money expended.

Meteorological Report

For September---	1915	1914
Maximum temperature	75.46	80.4
Minimum temperature	43.80	42.7
Monthly mean	58.63	61.7
Departure from normal	--1.77	+1.3
Precipitation	2.20	.56
Departure from normal	+1.12	--.52

Precipitation for the year 1915 up to Oct. 15th ... 21.88
Normal precipitation for the 12 months ... 15.22
Amount above normal ... 6.66

Siloed Beet Tops

H. Mendelson

We siloed last year the beet tops from several of our farms in the Sterling district in pit siloes with the following results:

Acres harvested	432
Tons beets per acre	15.5
Tons tops put in silo	2570
Tons tops hauled out of silo	1729
Tons siloed tops produced per acre	4.0
Cost of siloing, including pit	$1860
Cost, per acre	$ 4.30
Cost per ton silage produced	$ 1.08

The silage was of good quality and was readily eaten by cattle. Sheep seemed to have difficulty with the top and cows usually preferred the leaves.

The silage was carefully sampled and analyzed. We give below as comparison, analysis of corn silage and wet pulp:

	Siloed tops	Pulp	Corn silage
Per cent dry substance	28.4	11.0	20.9
Per cent digestible protein	1.9	.9	0.9
Per cent digestible carbohy ratio	12.5	9.0	13.0

As far as the analysis goes, the difference between the digestible nutrients in the top and corn silage is negligible. The larger dry substance in the siloed tops is explained by more dirt. We estimate the dirt at about 7%. This undoubtedly makes top silage a less desirable food than corn silage. It is, however, much cheaper.

Our feeding operations were not quite conclusive as to the practical value of beet tops as compared with pulp. It seemed that beet tops and alfalfa alone do not produce as good gains as pulp and alfalfa mainly because the animals

do not seem to be able to eat so much food in form of tops as in form of pulp.

In the old country where all beet tops are siloed, they are always fed in conjunction with some concentrate, or with pulp.

Nevertheless siloed beet tops can be obtained where there is no pulp available. There ought to be enough low grade wheat available this year to feed with the alfalfa and tops.

We are continuing experiments with siloed tops and can only advise the farmer to do the same.

Livestock Market Letter

Ben Kemper, Pres. Denver Livestock Com. Co.

Receipts of cattle at this market and at all other markets have been extremely heavy for the last two weeks. Prices have been going lower every day on the most kinds. The cattle that have suffered the worst break are fair to good steers weighing from 850 to 1050 suitable for the feed yards in Northern Colorado. This class of cattle are 25 to 50 cents a hundred lower than they were three weeks ago, selling largely for dehorns from $6.25 to $6.50. Choice kinds some higher, and some plain, good doing cattle, as low as six cents. Horned steers, of good quality, selling largely from $6.10 to $6.35. Choice native horned steers up to $6.75. Native cows, of fair kind, can be bought on this market from $5.00 to $5.35. Good fleshy kinds, suitable for beet tops for short feed, from $5.35 to $5.65. Bulls largely from $4.60 to $4.80.

Indications are that these heavy receipts will last for the next two weeks, and after that we expect to see these cattle higher and would advise buying these cattle at present prices.

I look for a good strong demand here for fat cattle after the first of December, and indications look now as if there will be some margin in feeding these cattle this coming winter.

Grasshoppers

A. C. Maxson

The grasshopper appears to be coming into his own again in many parts of northern Colorado. There were many eggs deposited along the fence rows and ditch banks this fall. Now is the time to disc these places to destroy the egg pockets. Discing will break the egg pockets open and the birds, especially pheasants, will feed upon these eggs freely. The exposure to the elements will destroy many eggs also.

Plowing will be found very effective in controlling hoppers if the eggs are plowed under to a depth of at least five inches and the surface worked down fine. Shallow plowing or plowing left open at the surface is of little value in hopper control.

I Remember

I remember, I remember the house where I was born, the little window where the sun came peeping in at morn. You'd hardly know the old place now, for Dad is up-to-date and the farm is scientific, from back lot to the gate. The house and barn are lighted with bright acetyline, the engine in the laundry is run by gasoline; we have silos, we have autos, we have dynamos and things, a telephone for gossip and a phonograph that sings. The hired man has left us---we miss his homely face---a lot of college graduates are working in his place. There's an engineer and fireman, a chauffeur and a vet., 'lectrician and mechanic, Oh, the farm's run right, you bet. The little window where the sun came peeping in at morn now brightens up a bath room that cost Dad a car of corn. Our milkmaid is pneumatic and she's sanitary, too, but Dad gets fifteen cents a quart for milk that once brought two. Our cattle came from Jersey and the hogs are all Duroc, the sheep are Southern beauties and the chickens Plymouth Rock. To have the best of everything that is our aim and plan, for Dad not only farms it, but he's a business man.

----E. F. McIntyre.

A Share for the Soil

A. H. Snyder in "Successful Farming"

"A part for sale and a part for the soil," would be a good slogan for the grower of almost any kind of crops. Furthermore, it is just as important that the part for the soil be delivered to it in proper condition as that the part for sale be disposed of to advantage.

Corn and small grain, the predominant crops in the corn belt, yield a generous portion which is of immense value to the soil but comparatively much less valuable as a marketable product. In many cases no attempt is made to deliver to the soil its portion.

This thought was brought forcibly to mind by the observation of heaps of ashes in a number of fields in the wheat section of our territory and the thought of the immense value of the humus which could have been made from the straw thus consumed.

In a number of the older farming states, farms are abandoned for lack of humus---rotting vegetable matter---even though they are fairly well supplied with the mineral elements which make a fertile soil. Notwithstanding this fact, the newer states are extracting tons of humus from their soil every year and consigning it to the air through the burning of cornstalks and straw.

The value of these materials is much greater than the cost of the fertility elements contained in them. In the majority of cases their effect by way of putting a soil in condition for plant growth is of much more value than the plant food obtained from them.

An ample supply of humus has an important effect in reducing the loss due to soil washing. Of equal, or greater importance in many sections, is its influence in preventing soil blowing. Crops grown upon soils well supplied with humus suffer less from extremes, either of wet or dry weather, than crops grown upon worn out soils. Humus makes the soil warmer and makes it more loamy so that there is less trouble with clods and a seedbed is more

easily prepared. It furnishes food for bacteria which really give life to a soil; it makes a soil more open so that air can pass into it for the use of bacteria and to help make plant food available.

In a few words, the principal difference between many of the fertile prairie soils of the middle west and a considerable percentage of the so-called worn out soils of the east is a difference in humus content. The process of building up a worn out soil is largely a process of increasing its supply of humus. Those who have had experience or who have been observant can appreciate how much easier it is to keep a soil in good condition than to build it up after it has been depleted.

The expense and trouble incident to getting a growth of cornstalks and straw incorporated with the soil is nothing compared with growing a crop expressly for building up the soil as is necessary when a soil becomes depleted beyond the limit of profitable crop production.

The man who has sufficient livestock to utilize the roughage from his grain crops as feed and bedding, obtains a return from them in addition to their value to his soil. He is not the man who touches a match to his straw stack and stalk field.

The producer of grain for market has a somewhat more difficult problem, but even in his case it is a losing proposition to burn valuable humus-forming materials in order to save a little time or labor.

It is true that cornstalks and straw require somewhat longer to decompose than do clover and some of the other crops recognized as humus-forming crops, but this fact is not as serious a drawback to their use as many believe. By cutting up the stalks with a stalk cutter or disc and mixing them with the soil by discing before plowing, it is possible to incorporate them with the soil so thoroughly as not to interfere with the succeeding crop. In the case of corn fields husked from standing stalks it is not practicable to collect the stalks and distribute them upon another field, hence they must be handled in a manner which does not interfere with the growth of the succeeding crop upon that particular field. With straw, however, the case is different and it can be applied to the portion of the farm upon

which it can be used to best advantage. In the winter wheat section, where the practice of burning straw is most prevalent, good results have been obtained by spreading a light coat of straw upon the winter wheat. Its effect by way of preventing soil blowing, protecting the wheat against extreme weather, and as a mulch the following summer has been decidedly beneficial. An increase in yield of as much as five bushels to the acre has been obtained from this method. Until recently it was extremely difficult, in fact almost impossible to spread straw upon winter wheat sufficiently thin to prevent damage, but with machines now available it can be spread rapidly, evenly and as thin as desired, so that the practice should become general.

The best use for straw must necessarily vary upon different farms, but the important point is to recognize the value of any material capable of maintaining the humus supply of the soil and then utilize that material in the best possible manner. While preparing the part of the crop for market and endeavoring to obtain the best returns from it, do not forget to give some consideration to the part of this year's crops which rightfully belongs to the soil.

A Farm Successfully Rented

Between landlord and renter there lies a perplexing matter---the subject of long or short term lease. A great many worthy and much needed farmers are giving up the business entirely because of the unsatisfactory terms upon which they are compelled to rent, and not feeling the way clear to purchase land when it would be necessary to overburden themselves with a huge amount of debt.

Under these prevailing difficulties, J. A. Webb of Hamilton county, Illinois, settled on a one hundred and sixty acre farm on the one year lease contract, and his service proved so valuable to the landlord that he was able at the close of that term to secure a five year contract. Under these conditions, Mr. Webb felt that he could farm conscientiously, that is, arrange matters to his own inter-

est and at the same time be benefiting his landlord. Heretofore, it had been his object to get as much land in corn as possible, as this seemed to be the most successful crop grown without some sort of fertilizer.

The first year of the new lease, the tenant walked over the fields many times, contemplating. He selected the richest spots and planted to corn, the next best was planted to wheat, and the poorest soils were sown in cowpeas. On the farm was a tract that was usually planted to corn with poor results, as the thirty acres was always flooded with water when a slight rise occurred in a nearby stream. This was a puzzle all winter to the renter, but along in February he planted this field in redtop which made a magnificent yield until the weeds and wild grasses got a start, which was three or four years later.

From the beginning, Mr. Webb was alive to the value of livestock on the farm, and introduced six Hereford cows on his premises. Since then he had added many more to his herd, and his cattle industry has grown so large that he now ships about two cars of fattened two year old steers a year. In this manner he profitably disposes of all the corn and roughage grown on the place.

This long-lease tenant understands the value of manure and besides turning under great fields of cowpeas to enrich the soil and at the same time bring to himself great dividends in the production of corn and wheat, he judiciously spreads the barnyard manure upon the soil without any fear of benefiting the landlord alone in the undertaking. In the summer months the cattle roam at their own sweet will upon the pastures, nipping the grass, but at the same time leaving equally distributed a far richer element for the soil's benefit than they take.

Mr. Webb's first five year lease is over, and he has served another five years, and still he is at the business. The landlord is satisfied, the tenant has been making him money. The farm has been gaining in value every year under proper management. The tenant, too, is satisfied, for each year he has been steadily adding to his income, and the great expense of moving about with the uncer-

tainties and perplexities that go hand in hand with it has been eliminated.

Mr. Webb has established a four year crop rotation, and has introduced a small field of alfalfa on the premises, which proves to the citizens of this county that alfalfa can be successfully grown in southern Illinois. He also has been very careful to keep fences and out buildings in good repair, and to reward his efforts in this instance, and also to add to the appearance and usefulness of the farm, the landlord is erecting a large silo, which Mr. Webb contemplates will be a great saving in the handling of feed, for his beef herd. We are of the opinion that this case between landlord and tenant clearly demonstrates what could be accomplished everywhere, solving this troublesome problem.—H. H. S.

Preparing Next Year's Exhibits

Now is the time to begin preparing exhibits for next year's fair.

By carefully studying the exhibits that took first prize, you can find a means of winning next year. Do not stop with merely a cursory glance (too often a cursery glance) at the winning booth. Likely the man invested more capital than you care to spend on an exhibit, but capital never equaled brains yet. Study out the reasons why you like the exhibit, and what attracts you to it.

After you have discovered, in so far as possible, wherein lies his success, don't go home and forget about it. Go over to the Farm Machinery tent and get one of those little memorandum books they give away, and write down what you think. Use the whole fair in getting suggestions what to do, and what is more important, what not to do.

Gather together carefully the things you can use again next year, listing them carefully in your "Exhibit Book." During the winter, and early next season when an idea comes to you, write it down. Then use your "Exhibit Book" as the basis for your arrangement of your exhibit next year.—O. S. Rayner, Colorado Agricultural College, Fort Collins, Colorado.

The Farmer's Play

Perhaps you don't want to play, or you think you're too old, or you say you've forgotten how! No one is too old, nor too stiff, no one "doesn't want to play" although there may be a few who think they've forgotten how. All the sorrows in life may be helped to be eliminated by some active form of play or pleasure. It is good for man to play and for the farmer most of all!

You say that you do not need exercise, but that is a wrong impression, for your daily work tends to make you stiff and does not develop the fine, delicate muscles that bring ease, grace and bodily control. All active out-of-door games tend to this development. Why not play with your wife, with your children, with your neighbor and make the most of what there is in life for you? For an hour after supper take time to play tennis, base ball, volley ball or some form of amusement in which you are particularly interested. Your work will hold a keener joy for you, for you will have unconsciously acquired the attitude of play toward it.

You can never take wealth nor material possessions with you when you leave this world, but you can give to it and gain from it much pleasure in the pure enjoyment of the good and happy things of life. We were made to be happy, and the greatest material happiness comes through the enjoyment of some form of recreative sport, after a day of good work well done.

Don't sit on the side lines and watch! Come into the open and play! Drop your work for a few moments every day and play with your children, for verily a little child shall lead you back into that long forgotten kingdom of early joys and greatest of opportunities, your youth and all it held for you.—Edwina Mary Layman, Colorado Agricultural College, Fort Collins, Colorado.

THROUGH THE LEAVES

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Agricultural Notes

W. P. Hogarty

The harvest is completed and we are going to pay you something over $1,300,000.00 for your product. We wish to thank our growers for the harmonious relations that made the receiving of your crop a pleasure under circumstances not always the most favorable. I want to go farther and say, you were not only agreeable but fair in your dealings, when I know some of you questioned at times that the deductions made by the Company were not representative samples of the whole load. In individual tares this may be true, because you may take a half dozen tares from the same load with varying results, yet, on the average, I am confident that our tares were not excessive. For instance, the average tare from 29 receiving stations for eight days did not vary only a trifle more than one-half of one per cent. I want to explain to our growers what I mean by average of 29 stations. For example, John Smith at Berthoud had 15% tare and John Jones 9%. The average of that station would be 12%, and two farmers at Plumb had 3% and 5%, or an average of 4%; the average of the two dumps would be 8%, and the average of the 29 stations was 6.9%, 7%, 7.2%, 7.4%, 7.6%, 7.1%, 6.8%, 7.4%. This, in my mind, shows some consistency in our work, and that the law of averages will work out. During the fore-part of the harvesting season the soil was wet and the tares were high, and you and I both know that it is difficult to get just the right deduction under such conditions. I have seen some get a higher tare than I thought they had coming and others get away with a much lower tare than they should have received. The average amount of dirt that you receive back from the dumps where we have a screening device, is, I should judge at least 4% of the total load. At the factory we have no screening device so that all of the dirt goes into the bins. Assuming that the factory district is an average of the whole district their average tare should be 4% more than at the dumps because we get the 4% dirt that you haul back. We tried a new way of taring beets this fall

on the factory deliveries to see if it was possible, with any degree of consistency, to get this 4% that was due us, but we found after a week's trial that we could not do it satisfactorily and discontinued the method. Catching samples without a screen would give too wide a difference on the same kind of beets. Yet, with all of our efforts, the average of tares at the factory station is not 4% per cent higher than the average of the dumps.

We do not want the grower who complained because he thought his tare excessive to feel that he has hurt our feelings. Far from it. You have worked hard throughout the year to raise your crop, and you are entitled to all that you grow, and if you think our result is not right, see that we show you how we obtained the result. You should look after your own interests.

A story is told of a grower who came to the Hygiene dump this fall with a load of very dirty beets, that weighed 5,000 lbs. When the load was dumped 20% of the total load went through the screen and the tare basket caught a sample that tared 70%, making a total deduction of 90%, or leaving the grower 500 lbs. of beets out of a total load of 5,000. The grower took his ticket and thanked the employees at the receiving station for allowing him to get away with the team and wagon. Of course this was a mistake, but it really did happen.

When the freeze came there were 25,000 tons of beets yet to be delivered and it was a question how we could handle such a tonnage of frozen beets, and preserve them so that we could put them to the use for which they were grown, and by causing you some delay so as not to get too many frozen beets on hand at the factory we are going to get through without any big loss, and without rejecting but very few beets, and as a guess I would say that 20 tons would cover the amount of beets rejected as unfit.

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A list of 15 names of sugar employees came in this week with the request that their names be placed on the mailing list of "Through the Leaves." We are in a little different shape than most publications, as we are not in need of subscribers, but what we do need is contributors, especially so if this paper is kept up to the standard that it should be. This publication was originally intended for a

medium for the exchange of ideas between the growers of the Longmont factory and its management. At the present time, however, the mailing list includes about as many outside names as it does of our growers.

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The Great Western Sugar Company at their several factories have siloed sufficient stecklings to plant over 3,000 acres of seed the coming season. To give you an idea of the magnitude of this work these beets are now siloed in silos aggregating over 100 miles in length, and it will require the services of about 1,000 men for a period of three weeks to set out these beets in the spring, besides numerous teams.

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I notice that our growers are taking advantage of the good weather and are fall plowing. That is certainly pleasing to us. You will not only conserve the moisture but be way ahead in the spring, as the indications are we will have a dry, windy winter.

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I wish to call your attention to Mr. Mendelson's article in this issue on the feeding of live stock. These figures are taken from the factory feeding operations over a period of years, and a study of the figures of the value of the different food stuffs may save you from buying some high priced feed from which you do not get the proper returns.

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There are about 7,000 head of cattle on feed in the Longmont district and a few more coming in every day. It looks as though it might be a good feeding year. Pulp is much better than ever before and the dry substance in the pulp is at least 50% more than last year. The cattle that have been in the feed lots are doing so well that it appears we will have beef stuff before the market is ready.

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Some of our growers are already inquiring about next year's beet contract. We do not think our contracts will be ready until some time after the first of the year. It still looks as though there would be a seed shortage, yet our people are making every effort to procure additional seed.

Some Feeding Experiences

H. Mendelson

The Great Western Sugar Company fed in the five years 1910-1914, 32718 head of cattle in their feed yards at Sterling, Fort Morgan, Brush and Scottsbluff. Mr. A. Cross had direct supervision during this time of the buying, selling and feeding. Records were kept of each single item as far as it was possible, by the Accounting Department.

Experience with such a large number of cattle in different years under one management ought to be quite valuable.

In the first years we fed a comparatively short time, using corn in conjunction with pulp, hay, molasses and cotton seed cake. In the last two years we fed a comparatively long time without any corn.

In order to study the feeding effect of corn, we averaged the results of all the places where we fed more than 200 lbs. of corn per head, and compared them with the results where we fed no corn at all.

	(a) with corn	(b) without corn
Head of cattle fed	7451	13395
Average number of days fed	165.2	209.6
Lbs. gain per head	192.0	295 5
Lbs. gain per head per day	1.287	1.431
Lbs. food eaten per day--pulp	86.7	100.3
Hay	13.5	11.5
Molasses	2.02	3.54
Corn	2.33	
Cotton seed cake	1.12	1.32
Lbs. food eaten per 100 lbs. gain--pulp	6740	7010
Hay	1050	804
Molasses	157	247
Corn	181	
Cotton seed cake	87	92

The pounds gain per head are calculated from the average purchase weight of the lean cattle laid down at our

feed yards, and the average weight of the fat cattle at the point of sale. In other words, the shrink of weight during transportation has been taken into account. This shrink varies very much and averaged during the last five years about 40 lbs. per head.

We see from the figures that the steers eating corn were fed a smaller number of days than those getting no corn. They made very much smaller gains per day. The corn fed animals ate less pulp per day, less molasses and less cotton seed cake, but more hay.

If we figure pulp at $1.00 per ton, alfalfa at $7.00 per ton, molasses at $10.00 per ton, corn at $1.00 per 100, and cotton seed cake at $1.50 per 100 lbs. the cost of food per 100 lbs. gain is:

	With Corn	Without Corn
Pulp	$3.37	$3.51
Hay	3.68	2.81
Molasses	.79	1.24
Corn	1.81	
Cotton seed	1.31	1.38
Total	$10.96	$8.94

The addition of corn even if as cheap as $1.00 per 100 lbs. increased the cost of making 100 lbs. of live weight by $2.02. If the finish of the corn fed cattle were sufficiently better than of those fed without corn, the expenditure for corn might be justified. This does not seem the case, as we repeatedly topped the market during the last two years, where we fed no corn. In other words the results of our feeding experience warrant the statement that **corn fed in addition to pulp and molasses at $1.00 per 100 lbs., is not satisfactory, either in the daily gains made or in the financial returns.**

This is quite logical, as our usual ratio contains an abundance of cheap carbohydrates in the pulp, and the molasses which the carbohydrates of the corn cannot compete with. If there is any deficiency in the pulp-molasses-alfalfa ratio, it is probably in the line of easily digestible protein. This is furnished by cotton seed cake. This year, particularly when alfalfa hay, the usual source of protein, is high in price, but deficient in quality, it seems

advisable to use cotton seed cake, even if cotton seed cake is a little higher in price now.

At the average rate of 1.32 lbs. per head per day, as we have been using it for a feeding period of 200 days, about 260 lbs. per head is needed. This perhaps can be reduced to 200 pounds per head. It should be fed in small doses of ½ pound per day in the beginning and correspondingly heavier at the end of the feeding period.

Another very important point in feeding as bulky material as pulp and alfalfa is the length of the feeding period. Our Mr. Cross is of the opinion that the longer the steers are fed, of course up to a certain point, the heavier are the gains per head per day, and the figures we have confirm this. If we arrange our feed yards according to the average daily gain per head in the different years and average the five lowest gains and the five highest gains, we find that the five lots with the lowest gains averaged 1.186 lbs. gain per day and were fed 162 days, while the five lots with the highest gains averaged 1.549 lbs. gain per day and were fed 191 days. Furthermore, using the prices for the food eaten mentioned above, it costs $11.60 per 100 lbs. gain in live weight for the short fed cattle and only $8.94 for the long fed cattle. There is no doubt that often some feeders have more cattle than they can properly feed. They are then compelled to sell the cattle before they are finished at a low rate per 100 lbs. It is much better to feed 20 cattle 200 days than 25 cattle 160 days.

On the basis of our figures given above, we need per steer for 200 days feed about—

10 tons pulp equals	$10.00
2300 lbs. alfalfa equals	8.05
708 lbs. molasses equals	3.54
260 lbs. oil cake equals	3.90
Total cost	$25.49

The difference between the net price of 100 lbs. lean bought and 100 lbs. fat stuff sold, has been getting less every year. In our feeding operations it was—

$2.62 in 1911-12.
1.85 in 1912-13
1.46 in 1913-14
1.07 in 1914-15

This is mostly due to the increasing cost of the feeders without a corresponding increase in the price of the fat steers. As the price of feeder catle has gone down since last year, this margin probably will be larger this year.

The cost of feeding 200 days as above is	$25.49 per head
One 1000 lb. steer..	60.00 per head
Int. at 1% per mo.	3.00 per head
Total cost per head	$88.49

If we figure an increase of 1.4 lbs. per day, or a total gain of 280 lbs., the fat steer of 1280 lbs. will have to be sold at $6.92 net per 100 lbs. in order to break even. If the gain in live weight is less than this, of course the price for the fat steer must be higher in proportion to reach the same result.

The corn crop in the corn states has been badly damaged by frost before the grain was ripe, and there will be very little good corn for winter feeding. The effect of this catastrophe on prices of cattle is described by the "Breeders Gazette," as follows:

"Thomas Cross, Armour's cattle buyer, went through western Iowa last week and found few cattle going on feed for the winter.

"'Everywhere I went corn was badly damaged, so badly that the people did not fully realize it,' he said. 'Much of it will never be husked, let alone cribbed. When winter comes live stock will be rushed to market and we may expect several weeks of gluts, but winter feeding will be on a limited scale. Even down in northwestern Missouri they have laid in few winter cattle and the same condition exists over much of western Iowa.'

"Iowa is full of young hogs. The late-farrowed pigs have done well and they are saving a vast quantity of corn that otherwise would be wasted, but when winter comes growers will be under the necessity of rushing them to the stock yards. Consequently December is expected to witness a flood of light stuff. Cattle will also be shipped regardless of condition when feed gives out."

Zero Weather in November

A. C. Maxson

The last few weeks of beet harvest constitute a critical period both for the farmer and the factory. This was forcibly impressed upon the minds of all concerned by the low temperature on the 13th of the month (November) when a minimum of -2 degrees was reached.

Extremely cold spells at this time of the harvest threaten to cause a loss to the farmer by permanently freezing the beets in, on the other hand it means a loss to the factory because all beets not delivered, whether in the ground or out are so badly frozen that they cannot be handled without great loss. The above facts make the occurrence of such cold waves during the latter part of the beet harvest of interest to both the grower and the factory.

An examination of the records shows that below zero weather has occurred during November nine times since 1872 as given below:

Year	Min. November Temp.
1877	-1
1873	-18
1880	-14
1882	-4
1886	-6
1887	-14
1896	-9
1911	-2
1915	-2

From the above it will be noticed that since 1887 these extremes during November are less frequent. Whether this indicates anything further than that we are passing through a period of warmer years is hard to say. That it means that more severe Novembers will not be experienced in the future is very improbable. Only once during the period reported did below zero weather during November occur two years in succession.

Aside from the years reported above, there were 19 in which the minimum temperature for November was below 10 degrees.

This means that 28 years out of 43 we must expect weather which will very materially damage beets and make it necessary for the factory management to take measures to protect the Sugar Company against heavy loss.

How often do we have warm weather after these cold waves is another question which has been asked frequently since the 13th. Unfortunately no extended record is available in this office from which to make comparisons, however, in 1911 when the temperature dropped to -4 and -7 on the 10th and 11th of November, warmer weather followed so that beet digging was possible. The same thing has occurred this year.

Word of mouth reports state that this is not always the case so that we should be prepared for permanently freezing weather after November 15th at latest.

Livestock Market Letter

Ben Kemper, Pres. Denver Livestock Com. Co.

Denver, Colo., Nov. 24, 1915.

Receipts of feeding cattle and stockers continue heavy at this market and at all River markets. There seems to be disposition to liquidate the cattle before winter. Some parts west of us are short of feed and cattlemen are compelled to cut down in order to protect themselves.

Prices this week compare very favorably with the week before last and 15 to 25 lower than the best time last week. At the prices feeders are selling at they are quite a little lower than their cost a year ago. Good native dehorned feeders selling this week from $6.25 to $6.60. Choice kinds up to $6.80. Some good southern steers selling here from $6.00 to $6.40. Some plain cattle here, showing a little off in colors, selling from $5.50 to $5.75. They certainly look cheap for beet tops and pulp feeding.

Everybody seems to be at work in the country, and with the present outlet that we have for our beef, it looks as if prices will be fully satisfactory for beef cattle after the first of the year, and with the present weather we have, cattle should certainly be putting on good weight.

We believe the heavy run of the season is over and look for much lighter receipts from now on at this market.

Some Observations at Close Range

C. Q. Hartshorn

For several years some of us have been very much dissatisfied with the conditions at the pulp pit and the condition of the pulp as we received it and have snorted and raved to our neighbors and hired men and families as to how we were mistreated in the pulp deal, all of which did not seem to improve matters. But later some of us were able to talk matters over calmly and reasonably with the local management and help them make arrangements whereby we now have conditions and roads at the pit as nearly ideal as can be for the handling of that kind of stuff.

Now the Company has done nobly on the pulp pit, let's ask and boost for something more, to which we think we have a right, namely, a good wagon dump at the factory.

I, for one, am willing to fork onto a pile a portion of my beets and to help make the pile in such shape that it will keep to the best advantage, avoid driving over and destroying beets and do all those things that are necessary to help make a good pile, because that is part of the work that is necessary in changing a crop of beets into sugar, economically. But when we are dumping beets I want to drive up, dump my load and go right back after another. So let's ask the Company to put in some sturdy, sure, safe appliance, something that will do the business, even if they do screen our dirt back to us.

So much is gratis, but when I agreed to work for the Company for a few weeks the management told me that, in all my work, I should take the farmer's viewpoint as well as that of the company. In the matter of dirt tare or that part deducted from the weight of each load for dirt, I have had an opportunity to view the thing at close range and at all angles. I took tares in all the ways that I could think of and checked them against the regular; have taken tares with a fork, with a basket, a shovel and by hand and have even taken scales and brushes into the field and

there brushed and weighed the beets and dirt, and while results varied, my work surely showed that the Company was paying for all they were getting.

With my own beets some days I have thought the dirt tare was too high while others I have known that the Company was paying me beet prices for some of my farm. As long as a small sample is made to stand for a large load this must always be the case, but I think we can depend on the law of averages to place us right in the whole crop.

In the case of the original tare box at the factory, as the condition of the beets changed I was convinced that it took an over-amount of dirt. I brought this to the attention of the management. The box was immediately discontinued and one put in that can but take an under-amount of dirt.

I have visited various dumps, have watched the work done and helped to do it, have talked with the men in charge and in no case did I find a man but said his instructions were to be straight and square with the farmers as with the Company. I find a few, a very few, farmers who want to sell dirt to the Company for beets, but many who cannot realize how much dirt gets into a load of beets in one way and another. To these I would say, spend a few days on the dump and in the tare room.

Boost

Geo. Knutson

Do you know there's lots of people
settin' round in every town,
Growlin' like a broody chicken
Knockin' every good thing down?
Don't you be that kind o' grouch,
'Cause they ain't no use on earth,
You just be a booster rooster,
Crow and boost for all you're worth.

If your town needs boostin', boost 'er,
Don't hold back and wait and see
If some other fellow's willin'---
Sail right in, this country's free.

No one's got a mortgage on it,
    It's just yours as much as his,
If your town is shy of boosters,
    You get in the boostin' biz.

If things just don't seem to suit you,
    And the world seems kinder wrong
What's the matter with a boostin'
    Just to help the thing along?
'Cause if things should stop a goin'
    We'd be in a sorry plight,
You just keep that horn a blowin'—
    Boost 'er up with all your might.

If you know some fellow's failin's
    Just forget 'em, 'cause you know
That feller's got some good points,
    Them's the ones you want to show,
"Cast your loaves out on the waters,
    They'll come back," a saying true,
Mebbe, too, they'll come buttered
    When some feller boosts for you.

We do not know who the author of the above is, but he belongs to that class of people which is a genuine asset to every community. The note of this poem strikes a sympathetic chord in our nature. We cannot help but feel that the one who sees only the dark side of things has a very small and circumscribed vision. He seldom accomplishes anything worth while. A community blessed (?) by such and kindred spirits reminds us of a story Sam Jones once told. He said, "What would you think of a man who would go out to plow and harness together a mule, a billy goat, a skunk and a bumble bee?" Yet some communities seem destined to feel the influence of a kicker, a butter, a stinker and a stinger. But the community is in no way benefited by their presence. While the fellow who boosts, seeing the brightest, instead of the darkest, is not only himself the better prepared to accomplish, but is also a positive inspiration to his fellows. Hence our liking for the sentiment of the poem. Every community needs just such wholesome spirits. COME ON, FELLOWS, LET'S BOOST!

Marquis Wheat

H. H. Simpson

Marquis wheat is comparatively a new variety, having originated but a few years ago in the Ottawa, Canada, Experiment Station, and being introduced to the U. S. from there. It is an early maturing, red, spring wheat, and being semi-hard is usually preferred by mill men to the softer varieties. It has a short, compact, awnless head, with smooth, white chaff, and the berries are short and thick, much resembling Defiance in general shape. It does not shatter easily and stands well.

Much attention has been drawn to this wheat in Boulder county during the past year because of its apparent ability to withstand the rust. However, Marquis wheat is not rust proof and the reason for its not being affected so greatly as Defiance is because it matures ten days or two weeks sooner than the latter. This variety is giving a very good account of itslf throughout the Northwest states, and although as yet none of our experiment stations are very loud in their praises, still a number have it listed among their best yielding spring varieties. Although it has been known only a few years it is rapidly gaining followers. Throughout the wheat section of western Canada, Marquis is a leading variety and because of its early maturing qualities it is now being grown extensively in the San Luis valley of this state.

In the past Defiance has undoubtedly been the best spring variety for these sections and farmers should yet think twice before they give it up. To be sure, Defiance fell down the past season, but taking one year with another it is hard to beat. However, the progressive farmer is always on the lookout for varieties that will put more dollars to his credit, and consequently should never shove them aside without investigation, nor should he be willing to discharge an old servant on the personal appearance of a new one. The fact that the bushel of Marquis wheat brought down from Canada won the sweepstakes over all others at the recent Soils Products Exposition in Denver,

should not in the least influence farmers to grow it here without knowing what it will do.

Having had my attention called to this wheat, I secured 10 pounds of pure seed and distributed it to as many farmers in the spring of 1914. As the quantity was small, only two or three gave it any attention and their results showed very favorable for it. Mr. J. M. Wisecup also secured seed from a seed house in Missouri Valley, Iowa, and in the spring of 1914 planted 7 acres from which he harvested 357 bushels. Part of this wheat was sold for seed and probably 20 farmers in the vicinity of Longmont planted some Marquis wheat the past spring. An endeavor was made to get data from all these growers, but reports were received from just nine and only seven of these gave figures that could be used in table form. It will probably be of interest to readers of "Through the Leaves" to see the results, which are shown in the following table:

	Acres grown.	Time planted.	Time harvested.	Kind of ground	Bu. per acre.	Was it affected by rust?
John Ramsay	50	early	.....	beet	40½	no
John Ramsay	...	early	.....	alf.	35	no
Geo. Abbott	3	Apr. 15	Aug. 8	beet	42½	not much
J. M. Wisecup	8	Apr. 20	.....	alf.	43	no
P. K. Patterson	20	Mar. 28	.....	alf.	45	no
Henry Ohrt	37	Ap.3-10	Au.4-7	beet	41½	very little
C. E. Golden	19	Ap.3-10	.....	beet-al.	44	very little
J. N. C. Jones	10	Apr. 20	Aug. 1	beet	42	very little

Summarizing the above reports we have:

1. No. of acres reported on---147.
2. Average time of planting---Apr. 3 to 20.
3. Average yield per acre---41.2 bu.

Mr. Ramsay and Mr. Jones had some Defiance wheat planted at the same time on the same ground and both stated it was badly affected by rust. All the above men expressed themselves as being very highly pleased with this year's results, with the exception that the seed had

some bearded wheat mixed in. It also seemed to be the general opinion that it would require somewhat more seed of Marquis than they were in the habit of sowing of Defiance as it does not stool as much. They all agree that it matures from ten to fourteen days sooner than Defiance.

While this wheat bids fair to become a leading spring variety, still one or two years is not a thorough trial and farmers should not plant too heavy until it has been tried a little longer at our experiment stations.

Ground vs. Whole Grain for Live Stock

It is somewhat doubtful whether the grinding of corn for some classes of live stock is worth the labor and expense involved. Tests conducted for ten years at the Wisconsin Experiment Station showed an average increase in gains of about 6 per cent from grinding corn for hogs. The results for individual years ranged from 11 per cent loss to 18 per cent gain. The Iowa station has also done considerable work in testing various methods of preparing corn for hogs, and found that while grinding showed a slight increase in the feeding value of corn for older hogs, such gains did not begin to pay the cost of shelling and grinding. Soaked shelled corn showed to much better advantage than the corn meal, and also proved somewhat better than the dry ear corn.

It was a question however whether the difference in feeding value paid for the labor of shelling and soaking.

It is advisable to grind small, hard grains as kafir, milo, barley, rye or sorghum seed, as otherwise a large proportion of the feed may not be digested.

Ground oats for horses have not shown any great advantage over whole oats, except in the case of horses that are at very hard work or have defective teeth. Grinding oats for hogs, however, will increase their feeding value from 20 per cent to 30 per cent, since the hog is not able to digest the whole grain to advantage.

As much as 25 per cent of whole corn may remain undigested when fed to cattle. Unless hogs follow the cattle in the feed lot, it is therefore desirable to grind the corn to prevent this waste. Sheep will handle whole grain to much better advantage.—Chas. I. Bray, Colorado Agricultural College, Fort Collins, Colorado.

Permanent Agriculture

Kurt Grunwald
Consulting Agriculturist and Fourth Vice-President National Irrigation Congress

(Address delivered at the Twenty-second Congress at Sacramento, Cal., on September 17, 1915)

When, some weeks ago, I received an invitation to address this distinguished gathering on the subject of "Permanent Agriculture," the realization of the many ramifications of my topic, coupled with a distinct recollection of the value of time on this program, brought to my mind a little story I had just read in one of the popular magazines---a story with which many of you doubtless are familiar. It has to do with a well-known clergyman in the South who was blessed with a small grand-daughter of a particularly inquiring turn of mind. One morning, when he was deep in the preparation of a sermon, the youngster entered his study with the not unusual announcement that "she wanted to ask him sump'in."

"Honey," said the clergyman, "Granddaddy's very busy just now. Suppose you come back this afternoon."

"But it'll only take a minute," she persisted. "All I wants is for you to explain to me about the Immaculate Conception."

I see you get the application.

However, a little consideration of the matter eased my mind a lot. It became clear to me that in addressing the delegates to the International Irrigation Congress on the subject of "Permanent Agriculture," there would be no necessity for explaining what I may term 'elementary facts." I could, so to speak, take a running jump into the middle of my subject---and that is what I am doing now.

I think it was Humphrey who first defined the principles of "Permanent Agriculture" as a way to "use the land without abusing it."

Professor Cyril G. Hopkins, perhaps the foremost authority on the subject in America, puts it this way:

"It is the first business of every farmer to reduce the

fertility of the soil by removing the largest crops of which the soil is capable, but ultimate failure results for the land owner unless provision is made for restoring and maintaining productiveness. Every land owner should adopt for his land a system of farming that is permanent---a system under which the land becomes better rather than poorer."

At the risk of being considered more venturesome than wise, I am going to go these two eminent gentlemen one better. I submit that the principles of "permanent agriculture" applied today throughout the United States and Canada will double the yield per acre of cereals---the average yield, of course---and will enable the American farmer not only to maintain this mark, but eventually to surpass it---not for one year, but for every year.

Gentlemen, I ask you to consider just what that statement means. If today an Edison or a Burbank should announce that he had discovered a means whereby each acre in the United States and Canada, which is devoted to cereal crops, could be made to yield two bushels where it now yields but one, regardless of any reasonable expense involved, he would be hailed as the world's greatest benefactor. The value of the telephone, the electric light, of practically all of our most important inventions sinks into insignificance when compared to that of a discovery which enables a country to feed double the number of people from the same amount of land.

Recently there appeared in one of the great national magazines an interview with Mr. Carl Schurz Vrooman, the assistant secretary of agriculture, which bore the rather sensational title of "Lost---Ten Million Dollars a Day." That will give you some little idea of what "permanent agriculture" would mean to the United States in dollars and cents at the present time. The basis for this title was the following statement by Mr. Vrooman:

"If the American farmer would put into practice the scientific methods of agriculture that already have been worked out at the expense of government funds, and if prices held, he could increase his yield of corn and wheat alone by more than ten million dollars' worth for every growing day of the year."

Now, gentlemen, when Mr. Vrooman said "the scientific

methods of agriculture that already have been worked out," he meant "permanent agriculture"---no more, no less. This is made plain a little later in the interview when he says:

"One trouble has been all along we have been endeavoring to tell the farmer how to increase his yield rather than how to increase his net income. Henceforth we are going to tell the farmer how to do better farming---not merely how to grow more of this and that individual crop. We must take the farm as the unit---not the crop."

There you have it. That's the basis of "permanent agriculture," first, to treat the farm as the unit; second to increase net income. The farmer's capital is the fertility of his soil; a big crop yield is not a net income if it is produced by lessening his capital. "Permanent Agriculture" is the application of sound banking principles to the business of farming---the maintenance and increase of capital to the end that there shall be an increased net income.

I do not have to tell you that the basis of "permanent agriculture" is soil fertilization and crop rotation. I do not intend to go into the various systems of rotation. There are many that have been long since proved. Different systems suit different conditions. To attempt to deal with them in the time allotted to me would be useless. But what I want to say is this---that no matter what system of crop rotation you decide on, you will find that the introduction of a hoed root crop in the rotation of one year in four is absolutely pre-requisite to heavy yields of cereal crops. First, because of the direct advantages that accrue to the land itself from the growing of such a crop; second, because of the indirect advantages that come from the material increase in barn yard manure to put on the land. At first this may not seem clear. Let me illustrate.

There was a Hebrew peddler, who, by dint of industry and persistence, attained the dignity of a horse and wagon. This entailed responsibilities, such as establishing a commissary department for the horse, and so he entered into negotiations with the keeper of the livery stable in the small New England town where he made his headquarters---and let me tell you that negotiations of this character between a Hebrew peddler and a Yankee liveryman are

some negotiations. When the smoke cleared away, Jake accepted the fact that $12 a month was rock bottom. He had one more shot in his gun, however. "Vell," he said, "if I gif twelf dollars, how much you allow for the manure, eh?" "I'll tell ye, Jake," he answered, "at twelve dollars there ain't goin' ter be no manure."

A good many farmers entertain much the same idea about their farm that Jake did about his horse. They recognize the value of manure, but they provide no means for getting it.

Now the answer to that is a root crop. It means an abundance of food for stock. More food means more stock and more stock means more manure. More manure means more soil fertility. More fertility means more crops. Once you've got the idea you can keep going as long as you please. I've got to stop here.

Now, don't jump at the conclusion that I mean the growing of a root crop solely to provide food for livestock and for the direct advantages to the soil. It pays, even at that, but it doesn't have to be done For more than a hundred years, turnips, a crop of practically no monetary value, which is fed almost entirely to stock, has been the basis of agriculture in England. English farmers now grow 2,000,000 acres of turnips in rotation with 6,500,000 acres of cereal crops. A century of actual practice has convinced them that this system is responsible for their heavy yield per acre in cereals.

Now, the Englishman is proverbially slow to change any method that is working well. To exchange the good for the better is not one of his characteristics. So the British farmer is still growing turnips. But "turnips is turnips." The American farmer will not be content with a good root crop; he wants the best root crop. Let us look farther afield.

Agriculturists in Continental Europe were not slow to see the results England was getting from her turnip rotation after Thaer, the English Agriculturist, started the system early in the eighteen hundreds. They tried to get their farmers to adopt the system, but they were up against a stone wall. "Turnips is turnips." They had no market value, they had to be fed, not sold, they were

less profitable than the crops already being grown. To many of you those arguments will have a familiar ring. I have a mental picture of myself right now trying to get the farmers in the great irrigated west to grow turnips.

Then came the development of the sugar beet industry, forced on the people of France by Napoleon and quickly spreading to Germany, Belgium, Russia, Denmark, and Holland. It made a great change for the European agriculturists. They could swing the cow by the tail instead of taking the bull by the horns. Here was a root crop which had all the advantages of turnips, which possessed a large monetary value and which returned practically its entire bulk from the factory for feeding purposes, slightly reduced in feeding value, but with all the salts and minerals derived from the soil quite intact and ready to be returned to the land from which they were extracted. Today the sugar beet is the basis of agriculture in Continental Europe, as the turnip is in England. Since the great development of industrial alcohol, potatoes play an important part, also, as I hope to be able to touch on a little later, but sugar beets can be considered the basis of agriculture in Western Europe, and as such let us consider what they have done for the farmer there. In this connection, please remember that the "permanent agriculture" that would mean so much to the United States and to Canada is precisely what we are about to consider in its European workings. It is not a theory---it's a fact proved by more than 100 years of actual practice. For many years, the enormously beneficial effects of a hoed root crop, preferably sugar beets and potatoes, on succeeding cereal crops has been known to the European farmers. As a boy serving my apprenticeship in Russian Poland, the Granary of Europe, it was taught to me just exactly as I was taught that two and two make four. Imagine my utter astonishment on coming to this country, in my early manhood, on discovering an obstinate and generally accepted conclusion among American farmers, outside of scientific agricultural circles, that sugar beet culture injured the soil. In other words, I found the American farmer, as regards the sugar beet growing industry, at least, just one hundred years behind the times.

(To be Continued)

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